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ABSTRACT

This "Report and Order" from the Federal Communications Commission (FCC) represents the examination of thousands of comments and an expert determination of the future needs of the nongovernmental users of the radio spectrum in the United States. The proposals it contains will be part of the United States' proposals at the 1979 World Administrative Radio Conference of the International Telecommunication Union. It includes a background of the report; terminology and rules for the use of frequencies; table of frequency allocations; technical proposals; regulatory proposals; and administrative, operational, and miscellaneous proposals, along with associated appendixes. It is preceded by a statement by FCC chairman Charles D. Ferris and by a joint statement by Commissioners Abbott Washburn and James H. Quello. (TJ)

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

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In the Matter of)
)
An Inquiry relative to preparation for a)
General World Administrative Radio Conference) DOCKET NO. 20271
of the International Telecommunication Union)
to consider revision of the international)
Radio Regulations.)

REPORT AND ORDER

(Proceeding Terminated)

Adopted: December 5, 1978 ; Released: December 28, 1978

By the Commission: Chairman Ferris concurring and issuing a statement; Commissioners Quello and Washburn issuing a joint statement.

Section I.

Introduction

1. The ITU is an international organization of 154 member nations and has a history dating back to 1865. It is headquartered in Geneva, Switzerland. Through the ITU, nations cooperate in the use of telecommunications of all kinds to prevent interference, to provide common standards, and to promote the development of efficient technical facilities. It does this by several means, the most significant of which are: agreement among the member nations on a common set of international regulations [the function of Administrative Conferences]; agreement on common technical recommendations [the function of the International Consultative Committees (CCIR and CCITT)]; and registration of frequency assignments to radio stations to avoid harmful interference [the function of the International Frequency Registration Board (IFRB)]. Each country participates on an equal basis.

2. The 1973 Plenipotentiary Conference of the International Telecommunication Union (ITU) resolved that a World Administrative Radio Conference (WARC) be convened in 1979 to revise, as necessary, the international Radio Regulations. The ITU Plenipotentiary noted that since 1959, the year of the last such general revision, various world administrative radio conferences had amended the Radio Regulations on specific points without having been able to harmonize the decisions taken because of the limited nature of their agendas.

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It also noted that as a result of technical advances, some of the Radio Regulations need reconsideration. The Administrative Council of the ITU issued an initial agenda for the WARC in 1976 and a slightly revised agenda in 1977; modifications were further made to the agenda in 1978 to reflect the rearrangement of the Radio Regulations. The agenda for the 1979 WARC is shown in Appendix 1; we do not expect further changes to be made to the agenda by the Administrative Council which is scheduled to meet in June, 1979.

1979 WARC Preparatory Effort

3. The Commission effort for the 1979 WARC began in late 1974 when an FCC Steering Committee, having overall management responsibility, and four specialized Functional Committees were established. Also, some twenty industry advisory committees were created, each representing a particular radio service, to propose and justify spectrum requirements and suggested changes to other Radio Regulations.

4. At about the same time, the National Telecommunications and Information Administration (NTIA), which at the time was the Office of Telecommunications Policy under the Executive Office of the President, established a preparatory infrastructure within the Interdepartment Radio Advisory Committee (IRAC) which was analogous to that of the Commission's. Throughout this proceeding, coordination between the FCC and the Executive Branch[1/] has taken place.

Notice of Inquiry History

5. On January 3, 1975, the Commission instituted this proceeding with a Notice of Inquiry, FCC 75-6, 40 Fed. Reg. 3245, which solicited comments or recommendations from the public concerning revisions to the Radio Regulations which would then be considered by the Commission in developing United States' proposals. This Notice was followed by eight others during the course of the Commission's preparation of appropriate proposals to the Conference. The Second Notice of Inquiry, FCC 75-990, 40 Fed. Reg. 44606 (1975), asked for comments and information regarding the matter of alignment of the international Table of Frequency Allocations with the United States domestic table for the frequencies above 40 GHz, the use of small diameter earth station antennas, and the utilization of the frequencies between 100 and 1215 MHz. (On March 22, 1976, we released a Public Notice, No. 62477, which presented a composite tabulation of the non-government

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1/ As used in this Report and Order, "Executive Branch" means the agencies of the U.S. Government as represented in the IRAC.

spectrum requirements.) The Third Notice of Inquiry, FCC 76-1099, 41 Fed. Reg. 54309, solicited comments on a proposal for a revised international Table of Frequency Allocations; it also requested comments on a draft protocol concerning the communications of protected medical transports which had been proposed for inclusion in the Geneva Convention, and on methods proposed for specifying the allowable frequency tolerance of radio transmitters. The Fourth Notice of Inquiry, FCC 77-285, 42 Fed. Reg. 26923, discussed the comments concerning small antenna earth stations and requested further comment regarding allocations and technical characteristics; it also discussed the comments regarding frequency tolerance and submitted proposals regarding tolerances for frequencies and for spurious emissions. Finally, it presented technical proposals for spacecraft station-keeping and antenna pointing and for a new method of designating emissions. The initial comments regarding the proposal for a revised allocations table were discussed in the Fifth Notice of Inquiry, FCC 77-349, 42 Fed. Reg. 27756, and a modified proposal was submitted for comment. That Notice also included discussion of articles in the Radio Regulations dealing with definitions, technical matters, operational matters, and discussions of the Resolutions and Recommendations associated with the Radio Regulations. The Sixth Notice of Inquiry, FCC 78-263, 43 Fed. Reg. 18748, sought comments regarding proposals of a working party in the International Telegraph and Telephone Consultative Committee for changes in the methods of accounting and operating for public correspondence in the maritime mobile service. The primary topic of the Seventh Notice of Inquiry, FCC 78-264, 43 Fed. Reg. 18761, was the procedural provisions of the Radio Regulations relating to the advance publication, coordination, and notification of frequency assignments. It also solicited comments on technical matters including the appropriate value of the maximum permissible interference level in a telephone channel of the fixed-satellite service, the permissible level of interference from one satellite into another, and on the procedures for determining the coordination area around an earth station sharing frequency bands with terrestrial services. The Eighth Notice of Inquiry, FCC 78-265, 43 Fed. Reg. 18748[1/], once again treated comments regarding frequency allocations and submitted a further revised proposal for comment. The Ninth Notice of Inquiry, FCC 78-581, 43 Fed. Reg. 36139, concerned the matter of rearrangement of the international Radio Regulations into a more appropriate format.

6. Throughout this proceeding, thousands of United States citizens contributed countless work hours to this effort. Almost 2000 individual comments were made. These responses have all been reviewed and have provided us with a wealth of information for use

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1/ The Eighth Notice was not printed in the Federal Register. Only notice of its availability was given.

in the preparation of proposals for the 1979 WARC. For this, we commend and thank all the parties who have participated. We constantly reminded participants to keep in mind the importance of the 1979 WARC results; that decisions reached at this conference can be expected to provide the basis for international radio regulatory policy for most of the remainder of this century. By taking this action, the Commission is not substantively affecting the rights of any commentor or licensee. We must once again note that domestic implementation of the results of the 1979 WARC will require extensive consideration in the Rule Making proceedings.

7. A Special Preparatory Meeting (SPM) of the CCIR has just concluded in Geneva. The United States was a major contributor to the SPM and participated actively in that meeting which produced 112 documents which will form the technical foundation of decisions to be reached at the WARC next year. We have, therefore, taken careful note of the results of the SPM and have, wherever possible, conformed the contents of this Report and Order to the decisions reached at the meeting. (Persons desiring to review the documents adopted at the SPM may do so at the Commission's headquarters pending availability of the publication of the SPM report by the International Telecommunication Union. The official document is not expected to be available until approximately March 1979.)

8. The purpose of this Report and Order is to discuss the proposals and related comments from the various Notices, to indicate the needs of the Executive Branch, and to present a comprehensive set of proposals for the World Administrative Radio Conference. These proposals represent the combined thinking and agreement of the Commission and the Executive Branch. The Commission will recommend to the Department of State that this set of proposals be forwarded to the Secretary General of the ITU in January 1979 as the formal proposals of the United States of America to the 1979 WARC. NTIA is expected to make the same recommendation to the Department of State.

Report and Order Structure

9. The 1979 WARC will revise a major portion of the international Radio Regulations. (See Agenda for the Conference, Appendix 1.) This Report and Order is structured in the same manner as the U.S. proposals which will be submitted to the ITU in January 1979. (Particular note should be taken of the meaning associated with MOC and NOC in this Report and Order as compared to past Notices.)

10. The ITU Secretary General has requested that proposals to the Conference be submitted in the rearranged Radio Regulations format. (See Section VII.) This will assist the work of the conference. Accordingly, our proposals are in this format, as shown in Appendices 2 through 35. Both the new Regulation or Article ident and the old are used, e.g., RR No. 3090/84AF, N7/5. The relationships between narrative sections and associated appendices are set forth below.

TOPIC	NARRATIVE SECTION NO.	ASSOCIATED APPENDICES
Terminology and Rules	II	2-4
Table of Allocations (Art. N7/5)	III	5
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Administrative, Operational, and Miscellaneous	VI	25-33
Rearrangement of the Radio Regulations	VII	34
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11.-14. [Not Used].

DECEMBER 5, 1978

JOINT SEPARATE STATEMENT OF COMMISSIONER ABBOTT WASHBURN
AND COMMISSIONER JAMES H. QUELLO

RE: Docket 20271, WARC 1979 Proposals

President Carter has enunicated a policy of increasing the international flow of information and, for this purpose, has adopted a policy of increasing the use by the United States of international shortwave broadcasting...primarily by the Voice of America, Radio Free Europe, and Radio Liberty. The frequency allocations for international broadcasting contained in today's Report and Order -- totalling an increase of 865 kHz, --- reflect but one alternative now under active consideration within the Executive Branch of the Government. This total falls some 800 kHz short of the proposals that have been made by the International Communications Agency and the Board for International Broadcasting.

Inclusion here of the 865-kHz alternative was not based on any independent analysis by the Commission. The FCC has merely deferred judgment in this matter to other agencies of the Executive Branch.

In the interest of accuracy, we believe it should be brought to the attention of all interested parties, here and abroad, that at the time of the Commission's action (December 5, 1978) there has yet been no decision within the Executive Branch as to a final figure for a U.S.-proposed frequency allocation for international broadcasting.

This is the purpose of our joint separate statement.

December 6, 1978

STATEMENT OF CHAIRMAN CHARLES D. FERRIS

RE: Docket 20271, 1979 GWARC Proposals

For over four years the Federal Communications Commission has examined literally hundreds of issues related to the 1979 general World Administrative Radio Conference (GWARC). This Conference, which will begin next September, will review the international Radio Regulations and make decisions about use of the airwaves for the next twenty years.

The Commission's proposals will be forwarded to the Department of State which is responsible for forwarding the final U.S. proposals to the ITU. The Report and Order represents a careful and in-depth examination of thousands of comments and an expert determination of the future needs of the non-governmental users of the radio spectrum in the United States.

Throughout this process, I have sought, as Chairman, to have the Commission's recommendations reflect several important themes. The first is that our recommendations be based on the public comments of the thousands of interested individuals and groups who petitioned the Commission.

The second is that our proposals provide the United States -- and every other nation -- with the greatest possible flexibility in deciding how to use the available spectrum. Too often, international and national regulations are inflexible - restricting innovation, dramatically increasing communication costs, or even precluding development. If the Commission's recommendations are adopted at the Conference, each national administration will be able to choose how to best meet its national communications needs. This flexibility will aid the less developed nations, as well as the U.S., in communications planning, and will facilitate the development of innovative services which may radically restructure the way we communicate as we approach

the 21st Century. For example, new uses for communications satellites, new systems for electronic message distribution, should benefit from this flexibility.

A third principle underlying the Commission recommendations is that detailed analyses of the policy choices in communications planning are required. Even given the flexibility of U.S. proposals, the available spectrum is simply insufficient to meet all possible communications needs. Our recommendations make clear our policy choices.

A fourth and related principle is that every effort must be made to conserve the spectrum. The spectrum is one of our most valuable resources. Recommendations that encourage inefficient use of the spectrum will only lessen our ability to communicate - a precious ability in an interdependent world such as our own. As technology develops we must be able to utilize it to increase spectrum efficiency.

Finally the Commission's recommendations seek to provide our country with increased diversity in the electronic media. Adoption of the Commission's expansion in the AM broadcast band could provide hundreds of new stations which would allow those who have traditionally been excluded from our electronic media to enter into the communications mainstream. In an other example, the adoption of our recommendations would preserve the possibility of direct broadcast satellites providing new channels across the United States.

The Commission's formal work is over with the adoption of this Report and Order. I look forward to following the proceedings of the 1979 WARC Conference with great interest. Because of its fundamental importance, I hope all concerned citizens will also be watching.

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Section II.

Terminology and Rules for the Use of Frequencies

Terms and Definitions

15. Comments on possible modifications to terms and definitions (Article N1/1) were solicited in the Fifth Notice of Inquiry. The few comments that were received on this subject were reviewed in developing the proposals on needed changes. The terms and definitions of Article N1/1 are generally believed to be adequate; because of the profound effect of terms and definitions on the interpretation of the Radio Regulations, it is important that changes to this article be kept to a minimum. There are several terms and definitions, however, which require attention and are proposed for addition to Article N1/1. Definitions are proposed for Maritime Radar Beacon (RACON) (3062A), Transponder (3062B) and Maritime Transponder (3062C). The proposals for these definitions are necessary because of a need to expand the scope of the present definitions. Modifications for several definitions are proposed in order to clarify and broaden their applicability. Modifications to other definitions are made which conform to the results of the SPM. We are also proposing ADD No. 3023 which moves the terminology relating to the distribution of frequencies into Article N1/1. The remainder are proposed for no change (NOC). Our proposals are set forth in Appendix 2 herein.

Nomenclature

16. In response to the Fifth Notice of Inquiry, few comments were received concerning the provisions of Article N2/2 dealing with the Nomenclature of the Frequency and Wavelength Bands used in Radiocommunications (Section III). These provisions are believed to be adequate as they exist now and thus we are making no proposals for modifications to this Article, as shown in Appendix 2 herein.

Rules for the Use of Frequencies

17. Comments on the subjects of general rules for the use of frequencies, special agreements, special rules for the assignment and use of frequencies, and the regions defined in the frequency allocations

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were also solicited in the Fifth Notice of Inquiry. Again, few comments were received in these areas. In studying these areas and in reviewing the comments received, we have determined that the provisions of these documents are generally adequate and thus we are not proposing changes to Articles N5/3, N6/4, N8/6 and Appendix 24. A minor change to the title of Article N7/5 is required, though, to recognize the applicability of the proposed Table of Frequency Allocations to the frequency range 10 kHz to 300 GHz. These proposals are shown in Appendix 3 herein.

New Resolution

18. As mentioned in Section V (Regulatory Proposals) of this Report and Order, we are proposing to modify Appendices 1, 1A, 9 and 10 of the Radio Regulations and to add a new Appendix 10A which will allow notification of the regular hours of operation of an assignment and which will delete the requirement for notification of the maximum hours of operation. We are also proposing the adoption of a new procedure which specifies the applicability of the revised notification data to IFRB administrative actions. See Resolution No. CC in Appendix 4.

Section III.

Allocation of Frequencies

19. One of the principle mechanisms for accomplishing international regulation of radio consists of an extensive table which proceeds from one end of the radio spectrum to the other, and allocates frequency bands to various defined "services." This Table of Allocations is divided into sections which apply to three different geographical regions of the world. Region 1 encompasses Europe, Africa, and the Middle East. Region 2 encompasses the Western Hemisphere. Region 3 encompasses Asia, Australia, and Oceana. The Table of Allocations changes proposed during this proceeding were the subject of the majority of comments and reply comments filed. The proposal for the Allocations Table, contained herein as Appendix 5, has been developed after review and careful consideration of all points of view that were expressed, and is the culmination of extensive deliberations within the Commission and with the Executive Branch. In many instances, the identified requirements of a service could only be accommodated by sharing frequency bands with other radio services or partially accommodated by reducing the frequency bands available to the existing or proposed radio services. The resulting proposal for the Allocations Table, therefore, attempts to strike a balance between the needs and requirements of the various radio services and the inherent limitations of the spectrum resource.

Sub-Section III. A.

Spectrum Between 10 kHz and 4000 kHz

20. Continuing use of the frequency bands between 10 kHz and 4000 kHz is expected to be extensive, despite the growth of satellite technology in the higher frequency bands. The competition among services for the use of frequencies between 10 kHz and 4000 kHz is likely to remain for the next 20 years. Unfortunately, the demand for these frequencies far exceeds the available spectrum; thus, extensive sharing is required now and in the future. In actuality, few changes are proposed to the frequency allocations between 10 and 4000 kHz.

Amateur

21. The radio amateurs were most responsive to the Notices of Inquiry in this Docket. Their attempts to define their spectrum needs as well as to comment on the needs of other radio services provided useful information. Although many of their needs have been accommodated, it has proven impossible to satisfy their desire for a low frequency allocation. Power line carrier (PLC) operations and the extreme difficulty of satisfactory frequency coordination due to the unpredictable nature of amateur operations are obstacles to any amateur service allocation being proposed in this spectral range.

22. We feel that the proposal to allocate an exclusive band to the amateur service at 1860-1900 kHz will provide more useful spectrum than the existing shared allocation at 1800-2000 kHz. The initially requested larger band between 1715 kHz and 2000 kHz could not be accommodated due to the needs of the broadcasting and radiolocation services. The shared band at 1900-2000 kHz remains in our proposals.

23. No change in the band 3900-4000 kHz is proposed. This proposal has been made possible by our formulation of a new proposal which accommodates broadcasting requirements below 6 MHz, discussed later. Therefore, the proposal for a Region 2 exclusive allocation of 3500-3900 kHz for amateur use and shared use of 3900-4000 kHz, we believe, essentially satisfies the radio amateur requirements in this portion of the frequency spectrum.

Broadcasting

24. A proposal to expand the standard broadcasting (AM) band was conceived to provide for the future growth of the service. Access to more spectrum would enable the establishment of new broadcast stations in locations where it is either technically or economically impossible in the existing broadcasting band. This could result in the availability of the first aural service in some communities now denied that service. It also could increase diversity of programming choices available to listeners and result in greater access to the broadcasting medium by minority groups.

25. An alternative approach recommended by amateurs, the electric power community and others was to redefine the technical basis for the use of the existing broadcast band, 535-1605 kHz, through the imposition of 9 kHz channel spacing. They argued that the future needs of the AM broadcasting service could be met by the resulting increase in the number of channels without any increase in the total amount of spectrum allocated to the service. The technical feasibility of this concept has been established in Regions 1 and 3 under the conditions which exist in those Regions. Before 9 kHz spacing could be considered for use in this Region (Region 2), studies would be required to determine the technical, operational and economic suitability for Region 2 conditions. This is necessary due to the different approach to broadcast station assignment, protection criteria and antenna design currently utilized in the Western Hemisphere.

26. The American Radio Relay League (ARRL) also made an alternative proposal to convert the AM broadcasting service to a form of single sideband emission, and in conjunction, recommended a reduction of the channel spacing to 8 kHz. The technique, known as compatible single sideband (CSSB), was considered by the ARRL to be suitable for use by that service. When combined with the reduced channel spacing, ARRL indicated 27 additional channels would be available within the existing allocation.

27. The suitability of CSSB for AM broadcasting use has been extensively explored, both in the United States and by the International Radio Consultative Committee (CCIR). The conclusion given by the ARRL that suitable CSSB systems have been available for at least 25 years cannot be considered consistent with the known history of the international dialogue on the subject. Since the ARRL proposal does not specify the system of CSSB to be employed, we have concentrated our evaluation on the merits of the second part of the proposal - to reduce the existing channel spacing to 8 kHz, assuming an appropriate CSSB system could be found. In that context, the conclusions given above on the proposal to reduce the channel spacing to 9 kHz are applicable. Therefore, we conclude that the ARRL proposal does not constitute a viable alternative to our proposal to expand the AM broadcasting band. However, this does not preclude the use of single sideband techniques or reduced spacing in the expanded part of the AM broadcasting allocation.

28. Broadcast expansion also was proposed in the low frequency (LF) spectrum, at 115-190 kHz. The LF proposal was the subject of considerable comment by broadcasters, radio amateurs, the electric power interests and the Executive Branch. These comments addressed several issues: (1) the need for such an allocation; (2) the feasibility of sharing with existing services using the band; and (3) the economics and technical feasibility of such a service.

29. The need for the allocation was questioned by several parties, including the Utilities Telecommunications Council (UTC), especially in the context of balancing the needs of the broadcasting service with those of the electric utilities for power line carrier (PLC) operations. UTC felt that the service contemplated by the Corporation for Public Broadcasting (CPB) was essentially duplicative of the proposed use for the expansion above the existing AM broadcast band. UTC concluded that needs for additional broadcasting services could adequately be met by expansion or revision of the existing AM broadcasting band.

30. The economic and technical feasibility of broadcasting at these frequencies was also questioned by several commenters, including the National Association of Broadcasters (NAB). The NAB stated that broadcast stations in the LF band would be at a severe economic disadvantage due to the limited audience, as experienced by UHF-TV and FM stations, when those areas of the spectrum were first made available for broadcast use. NAB predicted that receivers for LF broadcasting would prove prohibitively expensive. CPB's extensive briefs on the proposal and the success of LF broadcasting in other parts of the world suggest otherwise.

31. Although there was considerable technical comment, the feasibility of sharing with the power line carrier (PLC) operations in this band and the probable interference to the broadcast service due to the high power operations of other radio services in the LF band has not been proved to our satisfaction. We must acknowledge, however, the importance of PLC operations in this band. Therefore, LF broadcasting allocations have been withdrawn from the attached proposed allocation table, Appendix 5 herein.

32. In the light of the decision regarding the LF band, the proposal to expand the AM broadcast allocation in the band 1615-1860 kHz achieves new significance. It is the best means of striking a balance between the needs of both the broadcasting and radiolocation services, while causing minimum impact to the other services operating in band.

33. We are proposing an international allocation that affords each administration the flexibility to allocate part of the band 1615-1800 kHz to broadcasting and part to radiolocation, subject to the international coordination requirements of proposed RR No. 3489C/195C. This approach is being adopted after extensive Commission study on the feasibility of sharing between the broadcasting and radiolocation services. It revealed that the same frequency could not be shared by the two services, although the feasibility of sharing with certain types of radiolocation systems is more favorable than with others. Therefore, we have concluded that the spectrum between 1615-1800 kHz would be insufficient to satisfy the entire needs of both services and have altered the proposed table accordingly. As the spectrum above 1800 kHz is more useful to the broadcasting service for propagation coverage reasons, we are proposing to allocate the band 1800-1860 kHz exclusively to that service. This enables the allocation of a larger band to the radiolocation service below 1800 kHz. Further discussion is contained in the radiolocation paragraphs.

34. The reallocation of 1800-1860 kHz to broadcasting was questioned by the ARRL as to its suitability for broadcasting use, as well as to the impact on amateur allocations. At these frequencies, the shorter range of the daytime groundwave signal enables more stations to be assigned to each channel than is possible in the existing AM broadcast band. While it is true that nighttime interference levels are greater here than in the existing band, this merely reduces the nighttime service area of the stations. This is consistent with our desire to offer greater programming alternatives in many areas of small geographic extent, such as neighborhoods within cities.

35. The proposal to add broadcasting in the band 3950-4000 kHz has been withdrawn because an alternative solution to satisfy the requirement for high frequency broadcasting has been found, as discussed in the section on 4.0-27.5 MHz. Alternately, we propose to delete RR No. 3496/202 in the band 3200-3230 kHz in order to permit broadcasting worldwide in a band with propagation characteristics similar to 3950-4000 kHz and to accommodate short range high frequency broadcasting requirements.

Travelers Information Stations

36. Travelers Information Stations (TIS) are low power transmitters that are used in conjunction with standard broadcast receivers to pass information of a local nature to motorists and travelers. The definitional status of the TIS has been uncertain during the course of this proceeding. We have decided that the service is a broadcasting service for international allocations purposes, but will be administered as a mobile service nationally. Accordingly, the bands 525-535 kHz and 1605-1615 kHz are allocated to the broadcasting service with RR Nos. 3484A/191A and 3484B/191B (see table for text). This allocation is not intended to be used for standard AM broadcasting purposes in this country.

Fixed

37. The allocations to the fixed service at 190-200 kHz, 1800-1900 kHz and 3500-3900 kHz have, in earlier Notices, been proposed for deletion based on the advent of other techniques used to satisfy the needs once accommodated by these allocations. No public comments to the contrary were received on this proposal during this proceeding. Therefore, the fixed service is being proposed for deletion in these bands for the benefit of the aeronautical radionavigation, broadcasting and amateur services.

Aeronautical Mobile

38. Because of continuing requirements for the existing bands, no change is proposed to the allocations to the aeronautical mobile service.

Maritime Mobile

39. Although the Maritime Mobile Service Working Group recommended the deletion of the various maritime mobile bands between 70 and 160 kHz, we are retaining this service in our allocation proposals. The Executive Branch has a continuing requirement for this service. We have reduced the maritime mobile service in Regions 1 and 3 in the 90 to 110 kHz band to a secondary status to provide improved protection for the LORAN C radionavigation system.

40. The proposal regarding the distress and calling bands at 500 kHz and 2182 kHz are discussed in the mobile section.

Mobile

41. The Third Notice of Inquiry introduced a proposal to have the band 1615-1750 kHz allocated to the land mobile service, shared with other services in Region 2, instead of the mobile service. Comments to this proposal were very limited in number. In the Fifth Notice of Inquiry, we alternatively proposed to maintain the present allocation at 1615-1800 kHz to meet present and future requirements. We continued this proposal in the Eighth Notice of Inquiry and we are continuing it again in this Report and Order.

42. To protect TIS, the mobile service has been proposed for deletion from the bands 525-535 and 1605-1615 kHz. The subject is treated under the TIS paragraph.

43. The Radio Technical Commission for Marine Services (RTCM) in its comments approved the reduction in the mobile allocation for distress and calling to the 495-505 kHz band as being within existing technical and operational capabilities, a conclusion confirmed by the SPM. RTCM noted that recent improvements in communications technology enable the proposed change. One commenter stated that practical operational experience was desirable before such a change

was made and recommended that the reduction should be made provisional. This is unnecessary, since it would only protect survival stations not in accordance with existing frequency tolerances, while denying the benefit of greater range to the majority of such stations. In addition, our proposed change will provide a new alternate calling frequency in the band 490-495 kHz to replace 512 kHz, and a digital selective calling frequency in the band 505-510 kHz when that system becomes available. The mobile allocation in the band 510-525 kHz has been proposed for deletion as a consequence of proposing to move the 512 kHz alternate calling frequency from that band.

44. We are proposing to reduce by 3.5 kHz the guard band on both sides of the distress and calling frequency 2182 kHz. This conforms to the intent of the 1967 and 1974 Maritime Mobile WARC's. Such a reduction has been made in Region 1 and the U.S. These 3.5 kHz segments are proposed to satisfy maritime mobile requirements.

Radionavigation

45. In the Third, Fifth, and Eighth Notices of Inquiry, we proposed the deletion of the secondary radiolocation service from the 10-14 kHz band in order to provide an exclusive allocation for the radionavigation service. This band is used by the Omega system for maritime and aeronautical radionavigation purposes. We are continuing this proposal.

46. In the 90-110 kHz band, we are continuing our earlier proposal to change the Region 1 and 3 fixed and mobile services to secondary allocations. This band is used worldwide for Loran C, and the proposals for secondary services in the other Regions will insure future protection for this system, which is expanding.

47. In the 1800-1900 kHz band we are proposing to delete radionavigation, due to the planned shut-down of Loran A operations in this band by 1980; Loran A is presently the sole user of that allocation. Our proposal to modify RR No. 3492/198 is consequential to this proposal. We are, however, proposing to continue the radionavigation allocation in the band 1900-2000 kHz.

Aeronautical Radionavigation

48. As supported by the Aviation Service Working Group, we are proposing to add the aeronautical radionavigation service, and delete the fixed service in the 190-200 kHz band. At 510-535 kHz we are proposing to upgrade the aeronautical radionavigation service to primary status from its present permitted status, although shared with TIS at 525-535 kHz. These proposals are intended to relieve the extreme congestion facing the aeronautical radionavigation service throughout the 200-405 kHz range which has made the process of locating new non-directional beacons very difficult.

49. At 1605-1615 kHz, we are proposing to delete aeronautical radionavigation. We are, however, proposing to maintain the aeronautical radionavigation as a primary allocation at 1615-1800 kHz to satisfy existing and future requirements.

Maritime Radionavigation

50. New secondary allocations for the maritime radionavigation service are proposed at 275-285 kHz, 325-335 kHz and 510-525 kHz. These allocations appear to be needed to accommodate future growth in the service.

Radiolocation

51. Throughout this proceeding we have attempted to satisfy the need for additional radiolocation spectrum around 1600-2000 kHz. In the Third Notice of Inquiry, we made a proposal for a secondary allocation at 1900-2000 kHz. This was in response to the Maritime Mobile Service Working Group request for the entire 1800-2000 kHz band. In the Fifth Notice of Inquiry, we proposed a primary radiolocation allocation at 1615-1800 kHz, along with regulation ADD No. 3489B/195B for radiolocation at 1615-1800 kHz and 3230-3400 kHz. Another regulation, ADD No. 3489C/195C, was proposed to assist administrations in developing agreements for the implementation of broadcasting in the proximity of international boundaries in order to preclude harmful interference to the radiolocation service. We also continued our earlier proposal for a secondary radiolocation allocation at 1900-2000 kHz. In the Eighth Notice of Inquiry we continued the primary

allocation proposal at 1615-1800 kHz, and secondary at 1900-2000 kHz, for the radiolocation service. We went on to indicate that in sharing radiolocation with broadcasting at 1615-1800 kHz, separate national frequency allocations would have to be made for the two services.

52. This proposal to upgrade the radiolocation service to primary status in the band 1615-1800 kHz in the international table but allocating it nationally to a sub-band, with another sub-band for the broadcasting service, was the subject of numerous comment. The radiolocation community supported the upgrading of the status of this service to primary, but questioned the need for the broadcasting allocation. NAB proposed to allocate 1605-1805 kHz to the broadcasting service and the band 1805-1860 kHz to the radiolocation service on a primary basis. In the subsequent reply comments of Offshore Navigation, Inc. (ONI), to the NAB comments, it was pointed out that such an allocation would not result in an even trade-off, since at present, radiolocation systems operate throughout the 1605-1800 kHz band. Indeed, some systems require access to spectrum below 1700 kHz, which would not be possible under the NAB proposal. (See ADD No. 3489B/195B).

53. The Corporation for Public Broadcasting (CPB) and the AM Service Working Group challenged the idea that sharing was not feasible between the broadcasting service and the radiolocation service. ONI stated that "... while certain of the premises and assumptions of CPB appear to require modification, ONI believes that its analysis /in their comments to the Eighth Notice/ will be a valuable tool at such a time as the Commission may actually be faced with the requirement of prescribing sharing criteria." Teledyne, Inc. agreed with the Commission that sharing was not feasible. In our view, the comments of ONI bear further discussion. It is because the premises and assumptions of some of the CPB comments are invalid that the decision that sharing is not feasible can be maintained by the Commission. At the same time, ONI's comment illustrates that the proposed international allocation does not preclude frequency sharing between the two services. For that reason, the CPB sharing study will be retained for such an eventuality.

54. There are legitimate competing requirements for the band 1800-2000 kHz which must be satisfied. The proposal of ONI, however, for an allocation of 50 kHz in the band 1800-2000 kHz for the radiolocation service and "other compatible uses", cannot be accommodated in our proposals to the WARC. The decision not to propose an amateur allocation at 1800-1860 kHz benefits the radiolocation service without

further fragmentation of the amateur allocation between 1860-1900 kHz. We feel our proposed secondary allocation at 1900-2000 kHz for radiolocation provides the best solution and we expect that considerable radiolocation activity can be accommodated on a secondary basis in that band.

Standard Frequency

55. The bands allocated to the standard frequency service at 19.95-20.05 kHz and 2495-2505 kHz are maintained, due to continued requirements for the service. However, we proposed in the Eighth Notice of Inquiry to add to 2495-2505 kHz and other standard frequency bands in HF, a regulation No. 3498A/203B which provides a secondary allocation for radio astronomy and passive remote sensing. This regulation supports the observation of "atmospherics" and other phenomena in scientific programs. No opposition to this proposal has been received. Thus, this regulation has been retained in the proposed Allocation Table.

Industrial, Scientific and Medical

56. We received comments suggesting that an ISM allocation be designated between 3 and 4 MHz in order to permit industrial heating applications with reduced shielding. We believe that economic advantages which might be gained by such operations are offset by the great needs of the communication services, and we are, therefore, not proposing an international allocation.

Sub-Section III. B.

Spectrum Between 4-27.5 MHz

57. As we have indicated before in this proceeding, it is apparent that requirements far exceed available spectrum. We feel that the high frequency spectrum will be called upon for many years to satisfy communication demands. Even with the operational use of other systems (e.g., satellites), there are ever increasing needs to satisfy relatively short and long distance requirements, particularly for the mobile services, which can best be met through the use of HF. We have also indicated that many administrations foresee a need to satisfy national (domestic and regional) requirements using the fixed high frequency service allocations. Requirements in remote areas particularly dictate the use of high frequency fixed allocations. This is expected to be true for some time. Thus, there is little spectrum that can be relinquished to meet other needs. We are, however, proposing certain reductions in some allocations to meet requirements of other services. We feel our proposals strike a correct balance, meeting the needs of many administrations by utilizing proper spectrum saving techniques.

Amateur

58. Throughout this entire proceeding we have attempted to make proposals which we felt would satisfy the amateur telecommunication requirements during the period expected to be covered by the 1979 WARC. In the Third Notice, we proposed some amateur expansion at 14 and 21 MHz through reduction of certain fixed service bands. In that Notice, we also proposed to rearrange the bands at 7 MHz to reduce the sharing difficulties experienced by the amateurs and high frequency broadcasting; and, although the total spectrum for the amateur service was not increased, the elimination of sharing held promise of relief for amateur users. In the Fifth Notice, we continued our proposals at 7 and 14 MHz, modified our approach at 21 MHz, and proposed an additional amateur band at 25 MHz. We noted in paragraph 24 of that Notice that we had been unsuccessful in finding bands at 10 and 18 MHz. In the Eighth Notice, we continued our proposal at 7 MHz, shifted slightly downward the proposed allocation at 25 MHz, proposed new bands at 10 and 18 MHz, and proposed deletion of the previously proposed expansion at 14 MHz.

59. In response to the Eighth Notice, the American Radio Relay League (ARRL), in regard to the proposed rearrangement of allocations between 6950 and 7300 kHz, was apprehensive that if the rearrangement is adopted by the 1979 WARC, broadcasting may continue to cause interference to the amateur service. Under these circumstances, ARRL is most reluctant to have the amateurs relinquish 7250-7300 kHz. While we recognize the apprehension of the amateur community in this matter, we believe that, on balance, we must move forward with our proposal for this portion of the spectrum as the best available solution to a difficult problem. Accordingly, we are continuing our proposal as shown in the Article N7/5 Table, Appendix 5 herein.

60. The ARRL, and amateurs in general, supported the proposed allocations at 10, 18 and 25 MHz; and these allocations are included in the proposed table. ARRL expressed the view, however, that: (1) 200 kHz could and should be added at 10.2-10.4 MHz on a co-equal shared basis between the fixed and amateur services; (2) similarly, the 13.95-14.0 MHz and 14.35-14.4 MHz bands could and should be on a co-equal basis shared between the fixed and amateur services; (3) the 18 MHz band should be expanded to 300 kHz; and (4) the 20950-21000 kHz allocation should be proposed despite the initial objection of the Executive Branch.

61. The ARRL recommended co-equal sharing between the fixed and amateur services at 10.2-10.4 MHz, 13.95-14.0 MHz, and 14.35-14.4 MHz based on the assumption that the needs of the fixed service for high frequency spectrum will continue to decline over the next two decades. In the case of the United States and most other industrialized nations, we concur with ARRL's assumption. In the case of the lesser developed countries, and to some extent a few developed countries, however, our bi-lateral discussions revealed that some administrations plan to expand the use of high frequencies to satisfy their need for national communications. These high frequency internal and regional circuits will provide communications not feasible by other means.

62. It is our view, and that of the Executive Branch, that the U.S. cannot disregard the stated requirements of other countries. Thus, we are not proposing co-equal sharing between the fixed and amateur services in the bands at 10.2-10.4 MHz, 13.95-14.0 MHz and 14.35-14.4 MHz. Similarly, we are not proposing any further increase of the 18 MHz band proposal. We are, however, including a proposal for allocation of the band 20950-21000 kHz for the amateur service.

63. In the Eighth Notice, we proposed RR No. 205B. This proposal did not receive substantive support from those few respondents who commented on the issue. We, therefore, have withdrawn the proposal from the Table of Allocations herein.

Aeronautical

64. During this proceeding, we have made few proposals concerning the high frequency spectrum allocated for aeronautical mobile (R) use. The Third Notice proposed one change at 21 MHz, and this was continued in the Fifth Notice. In the Eighth Notice, we proposed a modification to the 21 MHz band to conform to the 1978 Aeronautical Mobile (R) WARC results.

65. In response to the Eighth Notice, the Aviation Service Working Group (Special Committee 129 of the Radio Technical Commission for Aeronautics) did not supply comments in regard to the proposed allocations to the aeronautical mobile (R) service in the bands between 4 and 27.5 MHz. Aeronautical Radio, Inc. (ARINC), and the Air Transport Association of America (ATA) provided comments in which they fully supported the proposed allocations.

66. ARINC and ATA recommended one change in the band at 21 MHz. The current allocation table designates the band 21870-22000 kHz for use by the aeronautical fixed and aeronautical mobile (R) services. The ITU 1978 Aeronautical World Administrative Radio Conference (1978 A-WARC) recommended that 21870-21924 kHz be allocated to the aeronautical fixed service and 21924-22000 kHz be allocated to the aeronautical mobile (R) service. If the 1979 WARC were to adopt the Recommendation, provisions were included in the Recommendation by the A-WARC to revise Appendix 27 to include the new aeronautical mobile (R) Channels at 21924-22000 kHz. Relative to that band (21870-22000 kHz), the ICAO 1978 Communications Divisional Meeting concurred in the recommendation of the 1978 A-WARC. In the Eighth Notice, we proposed a division of the band as recommended by the ITU 1978 A-WARC. In their comments, ARINC and ATA recommended a different division, that is: (1) that 21870-21900 kHz be allocated to the aeronautical fixed service and 21900-22000 kHz be allocated to the aeronautical mobile (R) service; and (2) that a regulation be added to the band 21900-21924 kHz which provides for the phasing out of the aeronautical fixed service by 1990. We have doubts about the need of the aeronautical mobile (R) service, even in 1990, for more 21 MHz channels than has been recommended by the ITU 1978 A-WARC. Over the past three decades, the eight (double sideband) channels

at 17 MHz have not been heavily used. The 1978 A-WARC, with conversion to single sideband, provided a total of 23 channels at 17 MHz, an increase of 15 channels. The 1978 A-WARC Recommendation also provided 25 (single sideband) channels between 21924 and 22000 MHz. Since the usage has not been heavy on eight channels at 17 MHz, and recognizing that for propagation reasons the use at 21 MHz will be lighter than at 17 MHz, we are not persuaded that an additional eight channels (21900-21924 kHz) will, even in 1990, be required by the aeronautical mobile (R) service. We, therefore, are not proposing to add the regulation to the band 21900-21924 kHz as requested by ARINC and ATA. We are proposing, however, that 21870-21924 kHz be allocated to the aeronautical fixed service, and 21924-22000 kHz be allocated to the aeronautical mobile (R) service, as shown in Article N7/5, Appendix 5 herein.

Aeronautical Public Correspondence

67. In their comments to the Eighth Notice of Inquiry, the Aviation Service Working Group requested that exclusive high frequency spectrum be made available for public correspondence communications with aircraft other than those of the scheduled air carriers. In the Eighth Notice of Inquiry, we suggested a number of matters which could be investigated by the National Business Aircraft Association (NBAA) and other interested aircraft operators. It was not our intent to provide an exhaustive list of matters to be investigated, or to outline to those operators exactly what they should do, step by step, to attain their indicated objective. We have only a vague indication of the users; no information as to who would provide the service; no indication of ground facilities required or where those facilities would be located; no investigation of potential tariffs or the acceptability of such tariffs to the users; no indication of coordination completed with other administrations in regard to provision of this service at foreign terminals; etc. In summary, on the basis of the limited information supplied to date, we are not persuaded that there is a real need, or that it would be in the public interest, to propose exclusive allocations of the scarce high frequency spectrum for an aeronautical public correspondence service. We have not, therefore, included proposals to provide for aeronautical public correspondence in the attached allocations table.

Broadcasting

68. In this proceeding, the Commission has received many comments to its Notices of Inquiry with respect to allocations for the high frequency international broadcasting service. Through our Third, Fifth, and Eighth Notices, we attempted to identify the international spectrum requirements of this service, and to balance it against the needs of other services which must by their nature have access to the high frequency bands. The discussion must be concluded, and proposals to the 1979 WARC based on the varied positions of many interested parties must now be made.

69. Comments were filed in response to the Eighth Notice in regard to high frequency (international) broadcasting by a wide variety of parties, which included broadcasters, amateurs, and the general public. Since those comments reiterated many of the themes of earlier responses to this proceeding, they can be considered an adequate summary for the purposes of this document. In their comments, the International Broadcasting Service Working Group (IB-SWG), argued that the Eighth Notice did not provide sufficient additional exclusive spectrum for international broadcasting. The IB-SWG alternative expansion scheme was set forth in the Eighth Notice, at paragraph 49.

70. There were arguments presented that the spectrum allocated to international broadcasting should be increased two to three times beyond that set forth in the Eighth Notice. Further opinions were expressed that a shift to suppressed carrier single sideband (emission A3J) is undesirable; and that the United States should leave to other administrations the determination of that spectrum which should be allocated to international broadcasting.

71. As we stated in the Eighth Notice, at paragraph 52, the United States interests in international broadcasting are primarily those of certain Executive Branch agencies, such as the International Communications Agency (ICA), the Board for International Broadcasting (BIB), and the Department of State. Consequently, we have largely relied upon the NTIA to develop a coordinated position among Executive Branch agencies in regard to the spectrum which should be proposed for allocation to international broadcasting. Commission interests were also considered in the coordination process and the resultant recommended changes are set forth in the proposed Table of Allocations, Appendix 5 herein.

72. To accommodate the requirement for additional spectrum at the lower HF frequencies, we propose that regulation No. 3496/202 be deleted from 4750-4850 kHz in order to open that band to international broadcasting. In the bands above 5900 kHz, we are making proposals as set forth in the attached Table of Allocations, Article N7/5, Appendix 5 herein.

73. In summary, and attempting to satisfy the needs of all of the services requiring accommodation in the portion of the spectrum between 5900 and 26100 kHz, 250 kHz of the exclusive broadcasting allocation is proposed to be deleted from the band 25600-26100 kHz; 50 kHz of exclusive allocation is proposed to be added at 7250-7300 kHz. Aside from these two changes, the exclusive spectrum allocated to international broadcasting is proposed to remain unchanged. With regard to allocations shared (by RR No. 3506B/210B) with the fixed service, 1265 kHz of additional bandwidth has been proposed for international broadcasting.

74. The purpose of the additional allocations is to accommodate the growing number of administrations which engage in international broadcasting and to alleviate congested conditions. The ARRL argued that alteration of technical and operating practices of the HF broadcasting service would substantially reduce the congestion in those bands. The substance of several of these recommendations are included in our proposals, Appendix 14 herein.

75. In their comments, the National Association of Broadcasters recommended that the mobile service be added as a primary service to the band 25850-26100 kHz. In our proposal to reduce the 25600-26100 kHz broadcasting band to 25850-26100 kHz, we retain international broadcasting in the upper portion of that band (25850-26100 kHz) to avoid disturbing the remote pickup broadcast base and mobile assignments which have operated in that band for many years. A change in status from a national allocation to an international allocation would not affect the continued availability of those assignments in the United States. For this reason, we have not proposed the addition of the mobile service at these frequencies.

76. We believe that the various proposals for international high frequency broadcasting will satisfy the basic requirements for this service, while at the same time, will not jeopardize the satisfaction of other vital requirements in the high frequency portion of the spectrum.

Fixed

77. Throughout this proceeding, we have continually proposed some reduction in the fixed service allocations to satisfy the requirements of other services. In the Third Notice we stated that "It is our belief that the outcome of the 1979 WARC will not result in a large scale reduction of the amount of spectrum between 4 and 27.5 MHz which is currently allocated to the Fixed service." In the Fifth Notice, we made proposals to further reduce the fixed service allocations in favor of other services. We continue to feel that the 1979 WARC will not make major changes to the fixed allocations, and our proposals reflect these views.

78. In their comments to the Eighth Notice, United Press International advised that it is important that the various United States news organizations continue to have the use of suitable high frequencies and urged that the United States resist any curtailment of the comprehensive range of frequencies needed by United Press, and others, to disseminate news, including pictures, throughout the world. We concur with UPI. We believe that the proposed attached Table will permit United Press, and others, to continue to fulfill these stated objectives.

79. In their comments, the Pan Pacific Education and Communication Experiments by Satellite (Peacesat) requested that fixed allocations be provided between 4 and 27.5 MHz, that is, that 100 kHz be proposed between 3 and 8 MHz and that 100 kHz be proposed between 8 and 23 MHz. Both allocations would be employed for point-to-point radio networks interconnecting local and regional networks for simplex voice and radioteletype. We see no reason to distinguish Pan Pacific's point-to-point operations from other point-to-point services which will be accommodated in the fixed service bands, nor do we see a basis for defining Pan Pacific's operations as other than fixed service.

Maritime Mobile

80. Throughout this proceeding, we have attempted to propose sufficient HF spectrum to meet the present and expected future growth of communications in the maritime mobile bands. In the Third Notice, we proposed expansions at 4 MHz, 8 MHz, 12 MHz, 16/17 MHz, and 22 MHz; we also proposed new bands at 5 MHz and 21 MHz. In the Fifth Notice, we modified the proposal at 21 MHz, but we did not propose additional increases in allocations which had been requested by the maritime mobile interests. We did, however, propose

sharing between maritime mobile and fixed via a regulation. In the Eighth Notice, we proposed some reductions to our earlier proposals to accommodate national requirements, and to recognize the needs of other countries; we also proposed a modification to the regulation to permit low powered fixed communications.

81. In their comments to the Eighth Notice, the Maritime Service Working Group (Special Committee 69 of the Radio Technical Commission for Marine Services) and the American Telephone and Telegraph Company expressed dissatisfaction with the decrease in proposed allocations to the maritime mobile service which occurred between the Fifth and the Eighth Notice. Both the Maritime Service Working Group and AT&T urged that RR No. MOD 3504/209 be broadened as set forth in the Eighth Notice of Inquiry. Further, AT&T questioned the validity of our justification in sharing spectrum between the maritime mobile service and the fixed service.

82. In order to obtain agreement to an allocation table which the United States can present at the 1979 WARC, it has been necessary to make compromises, one of which involves the reduction about which the M-SWG and AT&T express dissatisfaction. With regard to RR No. 3504/209, we are withdrawing RR No. MOD 3504/209 for the band 4063-4438 kHz, and have restored the existing footnote 3504/209 which has been in use for many years. We have applied RR No. 3505A/209B to the expansion bands, that is: 4438-4500, 5200-5275, 8050-8195, 12180-12330, 16360-16460, 20010-20230 and 22720-22855 kHz. In proposed RR No. 3505A/209B, domestic fixed stations may operate with a mean power not exceeding 250 watts on a non-interference basis to the maritime mobile service.

83. In their comments, the American Waterway Operators expressed approval that the lower limit of the band 4063-4438 kHz had been restored. We have continued that proposal herein. Our proposals for the high frequency maritime mobile service are contained in Appendix 5 herein. The M-SWG expressed the requirement that the area of use of the two carrier frequencies 4125 and 6215.5 kHz, which supplement the carrier frequency 2182 kHz for distress and safety purposes and for call and reply, be extended to and made uniform throughout all regions of the world. Further, the M-SWG requested that one frequency in the 8, 12, 16, and 22 MHz maritime mobile service bands be designated for the same purpose as 4125 and 6215.5 kHz. This concept was addressed by the SPM, document XP/1055, Section 4.1.4.4 (Chapter 4). While, in general, we support the need for frequencies in the 4, 6, 8, 12 and 16 MHz bands for safety purposes, because of the limiting nature of the agenda, it appears best to address this question and to develop the best approach to satisfying the requirement, at the conference.

Radio Astronomy

84. We have attempted in this proceeding to satisfy the needs of the radio astronomy service. In the Third Notice, we proposed new allocations at 13 and 25 MHz and a suppression at 21 MHz. In the Fifth Notice, we continued the proposals at 13 and 21 MHz, and slightly moved the proposed allocation at 25 MHz. In the Eighth Notice, we once again continued the proposals at 13 and 21 MHz and adjusted the 25 MHz to accommodate other service needs.

85. In this Report and Order we continue the proposed deletion at 21850-21870 kHz. A new band is proposed at 13360-13410 kHz to satisfy the radio astronomy needs in this area of the spectrum. Also, a new band at 25690-25850 kHz is proposed to further enhance radio astronomy observations in this spectral region.

Broadcast Auxiliary

86. During this proceeding we have attempted to satisfy the requirements of the broadcast auxiliary use through continuation of the international fixed service allocation. We have revised our proposals over the course of this Inquiry in the 25 MHz area in order to accommodate the needs of all users. In their comments, the Auxiliary Broadcast Service Working Group supported the proposed Eighth Notice of Inquiry allocations at 25 MHz as shown in Appendix 5 herein.

Mobile except Aeronautical Mobile (R) Shared with Fixed

87. In the Third Notice, we stated that the Executive Branch indicated a requirement for more than 4200 kHz for mobile except aeronautical mobile (R), to be shared with existing fixed allocations. We proposed several bands to meet these needs. In the Fifth Notice, we continued to make proposals to satisfy the Executive Branch requirements. In the Eighth Notice we expanded the proposal by adding additional bands shared with the fixed service.

88. In their comments to the Eighth Notice, AT&T supported the concept of allocations shared between the fixed and mobile services. AT&T also expressed the view that high frequency spectrum in excess of that included in the then attached Frequency Allocation Table should be proposed for allocation to the maritime mobile service. Failing that, AT&T saw the concept of shared fixed and mobile

allocations as a means of providing additional frequencies, in addition to spectrum allocated on an exclusive basis which could be used to satisfy maritime mobile service communication needs. This possibility would have to be explored in a domestic rulemaking proceeding after the 1979 WARC. Our proposals for this shared use are shown in the Table of Allocations, Appendix 5 herein.

Sub-Section III. C.

Spectrum Between 27.5 and 1215 MHz

89. The spectrum between 27.5 and 1215 MHz is one of the more extensively used portions of the radio spectrum. The radio services operating there, in many instances, have become greatly relied upon and provide services which we expect to continue for an indefinite time. Consequently, the proposals to modify this portion of the spectrum have been considered in great detail. Only those changes deemed absolutely necessary have been proposed.

90. The principal proposals contained in this section are concerned with the satisfaction of expanding short range communications requirements of the aeronautical and maritime communities, with provision for the expanding requirements of the land mobile service, and with the continued satisfaction of our broadcasting requirements.

91. In this portion of the spectrum, as in most others, we have reached the conclusion that extensive sharing designations in the allocations table may be necessary to meet the ever changing requirements of various administrations. In some cases this multiple allocation process may result in sharing between services. We believe that this flexibility is necessary if all requirements are to be adequately accommodated.

470-890 MHz

92. The Radio Regulations presently provide exclusive frequency allocations between 470 and 890 MHz for the broadcasting service in Region 2. 1/ Region 2 includes North and South America and Greenland. In the United States, the band 470-890 MHz provides for UHF-TV channels 14-83 (70 UHF-TV channels each 6 MHz wide). Previous domestic decisions taken in Dockets 18261 and 18262, respectively, provide for land mobile access to a maximum of two channels in the lower 7 channels (14-20) in each of 13 major urbanized areas, and for re-allocation of the upper 14 channels (70-83) to the land mobile services nationally with existing TV translators accommodated on a secondary basis.

93. In previous Notices, we summarized requests of the broadcasting and non-broadcasting services for allocations in this portion of the spectrum. Those far exceeded spectrum capacity. We also noted the difficulties of projecting and justifying service requirements to the year 2000.

1/ Except that RR Nos. 3655/329A and 3660/332 provide for radio astronomy use of the 602-608 MHz and 608-614 MHz bands respectively, and RR No. 3661/332A provides for broadcasting-satellite use of the band 620-790 MHz subject to certain limitations; see, however, our proposal to MOD RR No. 3661/332A.

94. In our Fifth Notice, we proposed international allocations which would essentially align Region 2 allocations with our domestic allocation table. That proposal did not provide all the exclusive Region 2 spectrum allocations requested by broadcasting. Additionally it provided neither for the exclusive worldwide allocations requested by mobile services, nor for flexibility they requested in Region 2.

95. Our Eighth Notice introduced a regulation in the bands 470-608 MHz and 614-890 MHz, which proposed a primary co-equal allocation to the fixed, mobile and broadcasting services in the United States within 200 miles of neighboring country boundaries. We also reinstated a primary broadcasting allocation between 806-890 MHz. We emphasized that our Eighth Notice did not abrogate our domestic decisions taken in Docket Nos. 18261 and 18262. We stated that we fully intend to continue our process of international coordination and agreements, but that our proposal was intended to eliminate constraints on the United States which have resulted from the current international allocations table. While we were convinced of the need for allocating additional spectrum for the international mobile services, our Eighth Notice provided no worldwide exclusive allocations for short range communications in these services.

96. At this time, we are proposing to modify the international table of allocations for Region 2 along the following lines:

470-608	BROADCASTING, FIXED, MOBILE
608-614	RADIO ASTRONOMY
614-890	BROADCASTING, FIXED, MOBILE.

97. This proposal, if adopted by the 1979 WARC, would provide a Region 2 framework for administrations to consider developing broadcasting, mobile or fixed services as needs develop through the end of the century. International coordination and agreements for successful introduction of a service would continue to be needed along borders of Region 2 countries. An administration's decision to implement a service would be made as specific needs become clearer and technological improvements, now on the horizon, are realized.

98. The allocation proposal does not provide any exclusive Region 2 spectrum for broadcasting as requested by the TV Service Working Group, nor does it implement allocations of additional spectrum for use by the mobile or fixed services within the U.S.; it is an international allocation proposed for Region 2. U.S. domestic allocations for the 470-890 MHz band would remain unchanged. Extensive domestic inquiry and rulemaking would be required before reallocation of these channels to non-broadcasting services could occur within the U.S. However, no such rulemakings are contemplated at this time.

99. Technological development concerning improved television receiver design and narrower band mobile transmissions are being studied. New television receiver designs may reduce or eliminate frequency assignment restrictions which have greatly limited the number of TV stations which can be assigned. New developments in frequency and amplitude companding in conjunction with single sideband modulation may make land mobile operations more spectrum efficient. Cellular systems promise to improve mobile public radiotelephone. Other technological developments, such as spread spectrum, digital and analog trunking, etc., may have a considerable impact upon spectrum efficiency. Optical fiber communications systems promise to enhance cable distribution of information. These show promise for the future.

100. With respect to the communication requirement of the international mobile services, which had previously been considered for accommodation in this portion of the spectrum, we are now proposing to satisfy these needs outside of the 470-890 MHz band. We are proposing that the aeronautical mobile (R) service be expanded into the 136-137 MHz band, in a phased process; and that the short range international maritime communication requirement be satisfied by a similar phasing in process in the 216-225 MHz band.

Amateur/Amateur-Satellite

101. We discussed amateur allocations for the bands 220-225 MHz, 435-438 MHz, and 902-928 MHz in previous Notices. We proposed a secondary allocation in the 902-928 MHz band to provide for experimentation by the amateur service. We also proposed a primary mobile allocation at 220-225 MHz to which amateurs objected, fearing introduction of a CB type service in this band. Proposed RR No. 320A extended secondary allocations to bands other than 435-438 MHz, (specifically, 1250-1260 MHz, 2390-2400 MHz, 5650-5670 MHz, 76-81 GHz, 165-170 GHz, and 240-250 GHz) in which amateur-satellite operations could occur.

102. Amateur community comments to our Eighth Notice continued to express concern about a possible CB service at 220-225 MHz. ARRL stated that a total of 320 amateur repeaters exist in the U.S. in this band. There appeared to be no general objections to our other proposals. We propose no change from our Eighth Notice, except for the 220-225 MHz band.

103. Upon considering the needs of the maritime mobile service, and our inability to satisfy these needs elsewhere, we are convinced that a

primary worldwide allocation between 216-225 MHz should be proposed to satisfy maritime short-range communication requirements. To accomplish this, the amateur service has been proposed for a secondary allocation in 220-225 MHz. We are also proposing in ADD RR No. 3605A, that radiolocation continue as a primary service until 1990. No new stations would be permitted after that time, and any radiolocation stations authorized prior to 1990 would continue to operate on a secondary basis. Consequentially, our previous proposal regarding the mobile service is not being made.

Broadcasting

104. Comments of the television broadcast community have repeatedly stated that the public interest is best served by the exclusive reservation of 470-890 MHz in Region 2 for the television broadcasting service. Broadcasters opposed our Eighth Notice which proposed a regulation making broadcasting, fixed, and mobile primary services in the 470-890 MHz band in the United States within 200 miles of its borders.

105. The Council of UHF Broadcasters stated that our Eighth Notice "... suggests an intention to facilitate or force sharing of the entire UHF television band in every part of the country by mobile and fixed radio services ..." The Television Broadcast Service Working Group also expressed concern that the Eighth Notice "... jeopardizes the future growth of television broadcasting in the UHF band by proposing a footnote raising the mobile and fixed radio services to co-equal status with broadcasting in the United States." Broadcasters contended that the full UHF band will be needed, that new narrow band technology will enable land mobile needs to be met within existing land mobile allocations, and that the Eighth Notice footnote was inconsistent with goals of other nations in Region 2.

106. In the proceedings of Docket 18261, it was demonstrated that limited sharing of the UHF spectrum between broadcasting and land mobile is feasible. It should also be emphasized that the allocations to be made at the 1979 WARC are to be designed so as to meet the needs of administrations through the remainder of this century. Throughout our preparations for this 1979 Conference, we have attempted to develop a flexible framework in which the United States, as well as other administrations, could meet its changing requirements over that time frame. We feel it is incumbent upon us to maintain the flexibility to meet these ever changing requirements. Therefore, we shall continue our proposal to show broadcasting, fixed and mobile as shared service allocations in the 470-890 MHz band, except for the 608-614 MHz band, which we propose to be allocated for radio astronomy observations.

107. Terrestrial broadcasters opposed our proposed modification of RR No. 3661/332A which would provide for use of the band 620-790 MHz for audio as well as television broadcasting by satellite. Broadcasters contended that the amendment would be inconsistent with U.S. policy concerning use of the UHF-TV band. Interference would be caused to the existing broadcasting service and to the transmissions of television translator stations. Public service satellite systems would preclude new nearby UHF television assignments and would restrict the desired re-location of existing UHF stations in order to improve their coverage.

108. The broadcasting satellite community sees an opportunity in this band to provide public service applications such as educational radio, and communications for information and health services directed primarily to schools, libraries and hospitals, particularly in rural communities. This, we feel, could be done by sharing frequencies with the terrestrial broadcasting service in such a way that minimum interference would be caused to terrestrial services. A special frequency plan based on criteria and discussions developed in CCIR Reports and Recommendations was mentioned in our Eighth Notice.

109. Our proposed table continues to show the amended RR No. 3661/332A. The design of any satellite system is yet to be considered. 1/ However, protection now exists for terrestrial broadcasters from television broadcasting-satellite transmissions by the power flux density limits specified in RR No. 3661/332A. Sound broadcasting-satellite transmissions may require other power flux density limits. We believe that the power flux density limitations originally stated in Recommendation No. Spa2-10 should be further studied by the CCIR in order to facilitate the shared allocation. Proposed Recommendation No. FF herein would accomplish this. Moreover, introduction of any system would require agreement between administrations concerned and those having services operating in accordance with the table. Finally, domestic rulemaking would be required before any system could be introduced in the U.S.

110. The existing international allocations which provide for broadcasting in the 54-73 MHz, 75.4-108 MHz, and 174-216 MHz bands are vital to the continued provision of VHF-TV and FM services in this country. We are proposing the continuation of these allocations.

Land Mobile

111. The land mobile community has encouraged a policy which would provide for co-equal primary mobile, broadcasting and fixed service allocations in Region 2 between 470-806 MHz. Comments of the Private Land

1/ SPM documents XP/1105 and XP/1108 discuss, among other things, sharing between the broadcasting-satellite service and the terrestrial broadcasting service in the 620-790 MHz band.

Mobile Service Working Group to our Eighth Notice recommended that the services indicated in RR No. 3661A/332B be placed in the international table. This would provide a suitable Region 2 framework for preserving U.S. domestic allocations for the band 470-512 MHz, while making possible future domestic land mobile allocations between 512-806 MHz should estimations of growth be realized.

112. Between 806 and 890 MHz the land mobile community stressed the need for primary mobile and secondary broadcasting allocations in order to reflect domestic allocation decisions taken in Docket 18262. That decision provided land mobile full use on a primary basis of the 806-890 MHz band nationwide with existing TV translators on a secondary basis. This is in contrast to the 470-512 MHz band where land mobile use is limited to 13 major urbanized areas, and then only to part of the band in each area.

113. Arguments regarding growth of the land mobile service were presented to justify retention of present allocations to the mobile service in the VHF portion of the spectrum and acquisitions of new mobile service allocations above 890 MHz. Such allocations could also support a new Citizens Band service (control of model aircraft as mentioned by the Academy of Model Aeronautics might occur within some class of citizens band service).

114. There was much discussion during this proceeding with regard to the possible use of space techniques in the 806-890 MHz band; that topic is treated in the section entitled "Land-Mobile-Satellite". On balance, we believe that the introduction of ADD RR No. 3655A/329B into the proposed allocations table, to provide for the application of space techniques to the mobile service, would be in the public interest.

115. In summary, we believe that a flexible approach in the international allocations table will best serve the interests of the U.S., and we are, therefore, proposing a co-equal sharing of the entire band between 470-890 MHz (excepting 608-614 MHz for radio astronomy observations) between the broadcasting, fixed and mobile services. In addition, we propose to continue existing mobile allocations below 470 MHz (in the ranges of 25-50 MHz, 150-174 MHz, 406-420 MHz, and 450-470 MHz), to retain RR No. 3595/287 in order to continue to provide protection for land mobile users, and to provide for the possible application of space techniques to the mobile service in 806-890 MHz through the introduction of an appropriate regulation. We are also proposing that mobile allocations be provided between 890 and 960 MHz except for the band 947-952 MHz where exclusive fixed allocations are continued (in the bands 890-902 MHz and 928-942 MHz the aeronautical mobile service would be excepted in order to protect important radiolocation operations).

Land Mobile-Satellite

116. The Private Land Mobile Service Working Group identified a requirement for an allocation of spectrum to accommodate a land mobile-satellite service. According to the Working Group, this spectrum could be used in the future for long distance communications in operations such as cross-country trucking, railroading, and remote direction of emergency operations. The SWG specifically requested the bands 1427-1435, 2450-2500, and 8400-8500 MHz. In the Third Notice, we proposed to satisfy the requirement by placing the land mobile-satellite service in the 2450-2500 MHz band and in the 8400-8500 MHz band; in both instances the service would have been on a secondary basis to the existing services. In addition, we proposed RR No. 3655A/329B for Region 2 in the band 806-890 MHz to provide spectrum for the possible development and use of a mobile-satellite system for public services.

117. Comments to the Third Notice opposed our RR No. 3655A/329B proposal on the basis that: (1) it did not provide any unique service which could not be accommodated within the other mobile-satellite services; (2) the 806-890 MHz band was the home of the future terrestrial land mobile services; (3) the fundamental sharing problems that can occur when one or both sharing services are mobile had not been addressed; and, (4) space radiocommunications in this band might limit spectrum efficiency by the inability to re-use channels on a geographic basis to the same extent as the terrestrial services. In the Fifth Notice, we retained the regulation proposal but requested comments on the objections stated above and on possible frequency alternatives for the allocations. The proposals at 2450-2500 and 8400-8500 MHz received very little comment, other than a request to designate the 2450-2500 MHz band proposal as an earth-to-space link.

118. The comments to the Fifth Notice once again were concerned mostly with RR No. 3655A/329B proposal. The Executive Branch (NASA and HEW), and other public comments, favored the proposal or some variation of it. The land mobile community, however, opposed it, particularly in the 806-890 MHz band, on the basis that: (1) the potential market is very limited; (2) this band is planned for short range terrestrial mobile communications; and (3) no specific technical proposals and feasibility studies had been presented. In response to this opposition, the Eighth Notice deleted the proposal for RR No. 3655A/329B, and indicated that the requirement would have to be satisfied in the proposals at 2450-2500 and 8400-8500 MHz and any other specific mobile-satellite allocations above 1 GHz.

119. In response to the Eighth Notice, comments from the Executive Branch (HEW) and others (COMSAT General and General Electric Company) urged retention of as much flexibility as possible with regard to the land mobile-satellite proposals, particularly with respect to RR No. 3655A/329B proposal. HEW stated: "the footnote [3655A/]329B option should be kept open, with the issue to be finally resolved domestically on the basis of studies and experiments which would take place in the coming decade." COMSAT General indicated that this satellite service could be developed to augment the terrestrial service, especially for use in the rural areas.

120. Although we continue to believe that the requirement should ultimately be satisfied in the bands above 1 GHz, we are persuaded that the near term satisfaction of this requirement in the 806-890 MHz band would have obvious benefits accruing from the present availability of equipment, a possibility for integration into the existing terrestrial land mobile system, and an opportunity to experiment with various system configurations. While it is true that the sharing feasibility studies are not complete, we are confident that such sharing can take place, at least on a limited scale, and we do not feel that the lack of such complete information, at this time, should be allowed to preclude an eventual implementation of such techniques. Accordingly, we have concluded that the proposal to introduce RR No. 3655A/329B into the Table of Allocations would be in the public interest. This proposal is being put forth with concerned reservation as to its proper method of implementation within the United States. This requirement is seen as a possible adjunct to, and not a replacement for, the services to be provided by the land mobile service in the 806-890 MHz band. Implementation within the United States, should such a system be proposed in the normal course of rulemaking, must maintain the integrity of our terrestrial land mobile services in this band and accommodate the expected growth of short range terrestrial mobile communication systems.

Maritime Mobile

121. We have recognized the need for proposing additional spectrum to fulfill requirements for short range maritime communications. Comments received from the maritime community to our Eighth Notice continued to identify need for 18 MHz of additional frequency spectrum. The Maritime Service Working Group (M-SWG) stated that data which had been submitted previously is as comprehensive and refined as can reasonably be developed; it also stated that the frequency range 512-530 MHz is preferred for the additional spectrum.

122. In response to our requests to identify what portion of the maritime requirements is international and what portion is domestic, the Maritime Service Working Group indicated that "... separate allocations for these needs would be wasteful utilization of the spectrum and would lead to unnecessary confusion of operating procedures and a costly duplication of systems and equipment." The M-SWG further stated that "... some countries may have so-called domestic needs for maritime communications..." but that "... domestic needs are, in reality, international in scope and should be satisfied by international allocations." We essentially agree with the maritime comments and consider the disadvantages of separate domestic and international allocations to outweigh the advantages; this is especially so for public correspondence services. Moreover, we attribute current difficulties with frequencies designated for use by RR No. 3595/287 as a reason for the need for a primary worldwide maritime mobile service allocation.

123. The maritime community continued to encourage a policy which would provide full-use of Appendix 18 frequencies for maritime communications in the U.S. by amending RR No. 3595/287 of the international Table of Allocations. Our table does not propose any change to this regulation. Regulation 3595/287 provides the latitude for administrations to decide which frequencies are assigned to stations in the maritime mobile service, and re-allocation of RR No. 3595/287 frequencies now used by land mobile services is properly addressed in domestic rulemaking.

124. In arriving at a final allocation proposal to the 1979 Conference concerning the satisfaction of short range maritime communications, a number of factors were considered. Among these were the ability of an allocation to satisfy the maritime requirement, acceptance of the allocation worldwide, and the impact of the allocation upon existing services occupying the band. Perhaps more importantly, the allocation proposal must make a clear, positive showing to the Conference that the U.S. views this as an important, valid requirement which must be satisfied somewhere in the VHF/UHF portion of the spectrum. We are proposing, therefore, to satisfy the requirement through a worldwide primary allocation to the maritime mobile service in the 216-225 MHz band. Regulation No. 3605A/297A would be added to the band 216-225 MHz, to reduce the status of the radiolocation service to secondary after 1990. While we recognize the opposition this proposal may receive at the Conference (this band is for television in Region 1), we feel the need dictates that we propose a band to satisfy short-range maritime requirements. National implementation in a domestic rule-making may have to consider phasing out of radiolocation after the 1990 date in some U.S. locations in some small parts of the band. Additionally, this proposal would reduce the Region 2 amateur allocation to a secondary status. While the current investment in this 220-225 MHz band by the amateur service is significant, we believe the requirements of the maritime mobile service necessitate such action.

Aeronautical Mobile (R) and Public Air-Ground Correspondence

125. In our Eighth Notice, we stated that we were convinced of the need to allocate additional spectrum to meet aeronautical short range communications requirements. However, we were not able to identify frequencies to meet the need. Instead, we noted that a substantial portion of the identified requirements were domestic in nature. We asked for an indication of the percentage of total requirements which require worldwide allocation, and for some way to distinguish between international and domestic needs.

126. In their response, the Aviation Service Working Group (ASWG) saw no useful purpose in separating domestic and international aeronautical services. Aeronautical equipment standards, frequency planning, and communications systems are planned in the international arena. In addition, ASWG stated that "... a dual system of allocation would be an inefficient use of frequency spectrum, confuse operating and safety procedures and result in unnecessary duplication of equipment and systems in the aeronautical services." We are persuaded that the disadvantages of separate domestic and international allocations for the aeronautical mobile (R) service outweigh any advantages.

127. With benefit of the results of the recently completed ICAO Communications Division Meeting 1/, as well as recognition of our inability to provide spectrum between 584-614 MHz for operational control communications, the aeronautical community focused its request for additional spectrum on the 136-138 MHz band. ARINC/ATA advised that the 2 MHz additional spectrum would not satisfy all of the needs for additional channels for operational control but could provide incentive to the development of narrower channel spacing. In addition, ARINC/ATA noted that regulations in the aeronautical mobile-satellite bands between 1535-1660 MHz permit use of frequencies for ground-to-air and air-to-ground transmissions to extend or supplement the aircraft-satellite links. While the ASWG agreed with the ICAO meeting recommendation that consideration should be given to operation within the band 118-136 MHz using channel separations less than 25 kHz, ASWG also felt that introduction of improved frequency utilization could best be accomplished by conducting studies and experiments at 136-138 MHz, and then introducing new techniques into 118-136 MHz, if findings support such action. The aeronautical community suggested a time frame which might extend into the early 1990's for phasing existing users out of the 136-138 MHz band.

1/ ICAO convened a Communications Divisional Meeting in Montreal from May 16-June 9, 1978, in preparation for the 1979 World Administrative Radio Conference.

128. We note ICAO's report concerning the adequacy of the 117.975-136 MHz band to meet the needs of international civil aviation up to the year 2000. "Most reliable analyses of this period appear to be in agreement and forecast at least a doubling of the existing level of activity which could place a severe demand on the availability of radio channels in this frequency range." 1/

129. While the aeronautical community limited its comments to the 2 MHz of spectrum which it needs for operational control communications, ICAO's comments apply to air traffic control communications as well as operational control. In the U.S., in the band 118-136 MHz, 4 MHz (128-132 MHz) is currently allocated to operational control; the remaining 14 MHz is allocated for air traffic control communications. Any frequency utilization improvements verified at 136-138 MHz would be most important for channels below 136 MHz.

130. We essentially agree with the aeronautical community concerning the need for 136-138 MHz, the plan for its development, and its potential for introducing narrower bandwidths between 118-136 MHz. Although we fully recognize the continuing long term requirement of space services in this band, we have proposed RR No. 3582A/281AB, similar to that discussed in our Fifth Notice, which would provide for the gradual reduction of the space research service and the consequent introduction of the aeronautical mobile service in 136-137 MHz.

131. In order to obtain the flexibility to implement satellite techniques within 118-136 MHz, should the need develop, our table proposes minor modification to RR No. 3573/273A. We understand that VHF satellite antennas now exist as standard equipment on Boeing 747 aircraft and that limited satellite service within present VHF bands could be implemented within a short time. Any such use of satellite techniques, of course, would be subject to coordination between the administrations concerned. We also propose to add RR No. 3572B/273B in order to permit satellite techniques for search and rescue operations using the frequencies 121.5 and 243 MHz.

132. In the Fifth Notice, we proposed to align Region 1 with Regions 2 and 3 in the 74.6-75.4 MHz band which is used for aeronautical marker beacons. In the Eighth Notice, we withdrew that proposal. Our proposed Article N7/5 Table of Allocations (Appendix 5 herein) contains no proposal to modify the present allocation.

1/ Report of the ICAO Communications Divisional Meeting Preparatory to the ITU World Administrative Radio Conference (1979), Montreal May 16 - June 9, 1978; p. 3-7 para. 3.2.3.1.

133. The ASWG expressed a need for allocations to provide for short range public correspondence communications links connecting aircraft to the public telephone network. The Common Carrier Domestic Land Mobile Service Working Group and AT&T also supported the need for these frequency allocations. In previous Notices, we proposed mobile allocations above 890 MHz which could be used for a public air-ground system. Requirements of the radiolocation service, especially within Region 1, would make the implementation of such a system very difficult and extremely unlikely. We, therefore, have withdrawn the proposed primary mobile allocations within the bands 896-902 and 941-947 MHz in Region 1. In the instant proposal, a mobile except aeronautical mobile allocation has been retained in Region 2 and conceivably could support such a system within the U.S. or the Region.

Radio Astronomy

134. Radio astronomy observations occur in a number of bands between 27.5 and 1215 MHz. While we are not proposing any new allocations for the service in this frequency range, we are proposing some modifications which should be beneficial to the service. We are proposing to expand the allocation at 38 MHz, and to upgrade part of the allocation to a primary status. We also are proposing to expand the 73-74.6 MHz allocation from Region 2 to a worldwide status, and to place a date limit on fixed, mobile and broadcasting operations in Region 2 in proposed RR No. 3551/253A. We would provide radio astronomy with a primary exclusive allocation in Region 2 in the 608-614 MHz band, where it is now afforded only footnote status. The existing allocation at 406.1-410 MHz is maintained. We believe that the above actions should adequately provide for continued astronomy research in this portion of the spectrum.

Industrial, Scientific and Medical

135. The existing international Table of Allocations provides for the operation of ISM equipment worldwide at 40.68 MHz (RR No. 3533/236) and in Region 2 at 915 MHz (RR No. 3670/340). During this proceeding, we have considered the merits of a worldwide allocation at 915 MHz for ISM equipment and included such a proposal in the Fifth Notice. After receiving limited support for this proposal, it was dropped from the Eighth Notice. We have given this further consideration and believe that it is in the best interest of the U.S. to forward such a proposal to the Conference. We, therefore, are proposing that RR No. 3670/340 be applied to Regions 1 and 3.

Sub-Section III. D.

Spectrum Between 1215 MHz and 10.7 GHz

136. The band between 1215 MHz and 10.7 GHz has become the prime home for the world's high density traffic routes because of the propagation characteristics at these frequencies and the development of an economically viable, practicable technology. However, only by adopting careful and well-defined sharing criteria will it be possible to obtain the maximum possible utilization of this part of the spectrum for high density services and to make reasonable accommodations for the dynamic growth in communications services foreseen in the next twenty years.

Fixed-Satellite (International)

137. The Fixed Satellite Advisory Committee in its allocations proposal of February 1976 (Document CC-FS-5/1) indicated the need for significant additional spectrum for the fixed-satellite service below 10 GHz to meet expanding international communications requirements. This need was discussed in its justification report of April 1976 (Document FS-1-8). Accordingly in our Third Notice, we explored the possibility of identifying an additional 800 MHz in each direction below 10 GHz. Such a spectrum requirement, particularly the need for the spectrum (in both directions) either to be continuous or to consist of large continuous segments, could not be accommodated, even in part, without imposing serious problems with respect to the usage of the spectrum by other services. Henceforth, there has been a continuing effort to find the additional spectrum necessary for the fixed-satellite service, while still satisfying the needs of other services occupying the same part of the spectrum.

138. At the time of the Fifth Notice, it was evident that 800 MHz of spectrum (in each direction) was not feasible, although there still remained the possibility of finding 500 MHz. Discussions with the Fixed-Satellite Advisory Committee indicated that a lesser amount of additional spectrum would severely jeopardize a necessary expansion of the service. In the Fifth Notice, therefore, tentative allocations for 500 MHz in both the up and down directions were identified, although again, the difficulties involved were recognized and discussed at some length (paragraphs 109-114, 192-197 and Appendix 5). Because of these

difficulties, detailed comments and suggestions were requested (paragraphs 114, 196).

139. Further work to attempt to resolve the many difficulties that arose in response to the Fifth Notice indicated that expansion in the 5 GHz band and substantial usage of the 3 GHz band would no longer be tenable approaches. Further, severe sharing problems with mobile services at the top and bottom ends of the 6425-6925 MHz band proposed for the uplink were fully recognized. Accordingly, the Eighth Notice left the allocation issue unsolved and continued to ask for comments (paragraphs 133-136). In subsequent comments, it was suggested that a band in the 2 GHz region (1850-2200 MHz), used in conjunction with the 3400-3700 MHz band, would be feasible as a down link. In the frequency band 2025 to 2110 MHz, coordination could be necessary to prevent harmful interference from tracking and data relay satellites to the fixed-satellite earth stations. In the frequency band 2110 to 2200 MHz, co-ordination with the mobile service could be difficult near population centers. However, presence of half of a dozen earth stations located at places far away from the population centers would not cause any disruption of the mobile service. To provide better compatibility between the fixed-satellite and the mobile services, we are proposing a RR No. 3706A/356B limiting the operation of the 1850-2200 MHz band to the international fixed-satellite systems.

140. The sharing difficulties between the radiolocation and fixed satellite services in the 3400-3700 MHz band have been documented in earlier Notices, and the utilization of this band by the fixed satellite service is expected to be severely restricted, perhaps being limited to only the upper portions of the band. Since these two services currently share the 3400-3700 MHz band, we are proposing that this allocation continue and that the sharing difficulties be treated at the time of any fixed satellite system design and implementation. We also see merit in the 2 GHz recommendation and are proposing that the 1850-2200 MHz band be also allocated to the fixed satellite service, shared with the existing services. These allocations, used in conjunction with the 6425-7115 MHz up-link, should ease the pressing demand for fixed satellite spectrum below 10 GHz.

141. It should be noted that the fixed-satellite service, earth-to-space, is shown as continuing up to 7115 MHz. However, the operation of mobiles in the 6875-7115 MHz band would preclude domestic use of the fixed-satellite service in this portion of the band because of inherent problems of sharing with mobile TV pickups. An additional requirement has been identified for feeding the fixed-satellite

and broadcasting-satellite services at 2500-2690 MHz. We have not specifically identified portions of the 6425-7115 MHz band in our proposals for these varying requirements, believing this more appropriate for domestic handling, or extensive discussion among INTELSAT members.

2.5 GHz Fixed-Satellite/Broadcasting-Satellite

142. During the latter stages of this proceeding, a number of comments were received concerning the accommodation of small earth station, user-oriented systems as contrasted to common carrier-oriented systems. Such comments were filed by the Public Interest Satellite Association (PISA), among others, and principally addressed the 12/14 GHz bands while visualizing small diameter antenna uplinks used in conjunction with a multiple spot beam antenna satellite. These comments are discussed further in the section on broadcasting-satellites above 10.7 GHz. In anticipation of the problems which might be encountered in trying to accommodate this type of service above 10 GHz (e.g., detailed planning of the broadcasting-satellite service), we have attempted to propose another allocation which would be suitable for the purpose. Considering the suitability of spectrum between 1 and 10 GHz for space services, and the large number of services and users seeking access, we have found the existing 2500-2690 MHz broadcasting-satellite band to be suitable for these kinds of services.

143. The types of services envisioned within a user-oriented system may give rise to considerations as to whether or not it is truly a broadcasting-satellite service. Therefore, we are concurrently proposing that the fixed-satellite service also be allocated in the 2500-2655 MHz portion of this band, in the space-to-earth direction. Along with this allocation, we are proposing that the allowable power flux density for both services in the 2500-2655 MHz portion be increased in order to accommodate the anticipated smaller diameter earth station antennas which will be employed. We have found it possible to increase power levels only in this portion of the band due to sharing problems with the adjacent band radio astronomy service. Uplinks for this service would probably be accommodated in the 6425-7115 MHz fixed-satellite uplink band which we are proposing. As stated in the section on fixed-satellites, we do not propose that any "pairing" of up- and down-links be made in the international Radio Regulations; we believe that this would best be accomplished either domestically or through planning within international service organizations.

144. Finally, we have considered the problems of sharing such a user-oriented satellite service with the existing terrestrial Instructional Television Fixed Service (ITFS). Such sharing considerations will necessarily force careful consideration of the manner of implementation of the satellite services. We do, however, believe that these two services are not mutually exclusive and that the satellite services may even operate as a possible adjunct to the ITFS. In any event, we believe that the possible services to be provided to the public through small diameter antenna, user-oriented systems would be available with this allocation proposal.

Aeronautical Mobile-Satellite

145. In previous Notices, we discussed the current status of aeronautical satellites and summarized related congressional hearings. Despite a pessimistic near-term outlook for an operational system, we noted the aeronautical community's concern that existing frequency allocations may be insufficient to meet planning purposes for the year 2000 and beyond.

146. In response to our Eighth Notice, the Aviation Service Working Group (ASWG) stated that plans for the use of the 5 GHz band have not changed, and that frequencies between 5000-5250 MHz have always been intended for paths between land earth stations and satellites. RR No. 3750/383B, however, would, among other things, provide the band 5000-5250 MHz for connection between air traffic control centers via satellite. We also stated that we foresaw a later generation concept, a single satellite system that would satisfy both aeronautical and maritime needs and requested comments as to where frequency allocations between land earth stations and satellites (feeder links) should be satisfied. While the maritime community is receptive, the aeronautical community opposes the concept. Aeronautical Radio, Inc. and the Air Transportation Association of America (ARINC/ATA) stated that the nature and operational requirements of each service are dissimilar. Aeronautical services emphasize the essential safety and flight regularity aspects of communications and exclude public correspondence; a large portion of maritime communications consists of public correspondence. Aircraft flying at 600 miles per hour need virtually instantaneous service for both air traffic control and operational control. Low-gain omni-directional antennas are needed for high-speed aircraft as compared to higher gain, more flexibly designed directional antennas likely to be used aboard slow-moving ships. The powers of the two services will probably be different. We recognize the desirability to maintain feeder links in aeronautical bands (e.g., 5 GHz); in doing so,

aeronautical safety service grade protection is assured. There is no need to introduce such protection in non-aeronautical bands. Frequency and equipment standards coordination would be limited to aeronautical bands. Finally, exclusivity would assure a basis for comprehensive planning of aeronautical needs without considering non-aeronautical services. Thus, we propose no frequency allocations for satisfying feeder links for combined aeronautical and maritime satellites.

147. While frequency allocation exclusivity is the desirable goal for the aeronautical community to pursue, there has been no information introduced to preclude maritime and aeronautical services, at some future time, from sharing a common space platform if economic factors are favorable and institutional arrangements can be found. For example, a common platform could provide facilities in the 5 GHz band for aeronautical service feeder links and in fixed-satellite service bands (e.g., 4/6 GHz) for maritime service feeder links.

148. The aeronautical community supported the ICAO Communications Divisional Meeting re-adjustment of the 1535-1660 MHz band to provide more equitable division of spectrum between aeronautical mobile-satellite and maritime-mobile-satellite services. We essentially agree with the substance of ICAO's re-adjustment for the aeronautical and maritime mobile-satellite services and have adjusted our table in consideration of ICAO's proposal. Our table provides 15 MHz uplink and downlink for aeronautical needs; frequency separation between bands is 94 MHz, meeting the desired minimum separation of 90 MHz between aeronautical mobile-satellite uplink and downlink communication bands. Allocations for the Global Positioning Satellite (GPS) system have also been taken into account and meet the minimum required 65 MHz separation between the GPS receiver center frequency 1575 ($\pm$ 12 MHz) and the aircraft earth station transmit band. A primary radionavigation satellite allocation is provided in the band 1566-1590 MHz and in the upper 3 MHz (1563-1566 MHz) of the aeronautical mobile-satellite transmit band. Indications are that aeronautical mobile-satellites and GPS can successfully share spectrum. These allocation proposals should permit a common GPS/communications package to be placed on the same aircraft and provide for a common receiver design.

149. Two 1-MHz uplink and downlink mobile-satellite allocations are proposed for distress and safety communications. We note that ARINC/ATA recommended 1 MHz downlink only, for interservice use as proposed in the Report of the ICAO Communications Divisional Meeting. We have, however, taken into account future needs of other mobile users who may require uplinks.[1/]

[1/] See, for example, the Report of the Technical Panel of the INMARSAT Preparatory Committee, dated 13 July 1978 (Section 9).

150. Other aeronautical allocations, while not proposed by ICAO, are desired for flexibility in planning Executive Branch services and are included in our proposals herein. These are the aeronautical radionavigation-satellite service in bands 1551-1563 and 1645-1660 MHz and the aeronautical mobile (R) and aeronautical mobile-satellite services in the band 1590-1624 MHz.

Maritime Mobile-Satellite

151. Our past Notices discussed the maritime mobile-satellite activity resulting from the operational MARISAT system and the preparatory work underway looking toward establishment of an international maritime mobile-satellite organization (INMARSAT). Those activities and the work of the maritime service working group have given rise to a need for doubling existing maritime mobile-satellite allocations in the uplink and downlink directions (i.e., 7.5 MHz to 15 MHz in each direction), and for an additional 5 MHz for uni-directional ship-to-shore requirements.

152. In contrast to the aeronautical mobile-satellite services which provide for feeder link needs in aeronautical bands, the maritime mobile-satellite service has satisfied feeder links in fixed-satellite service bands (e.g., 4/6 GHz). In our Fifth Notice, we proposed RR No. 367C which would use radionavigation bands for maritime satellite feeder links in a manner similar to aeronautical mobile-satellites. Comments in response to that Notice confirmed our concern of sharing problems with radars. We withdrew the proposal. In that Notice, we also questioned whether 5000-5250 MHz should be considered for maritime as well as aeronautical mobile-satellite service feeder links. While the maritime community supported the suggestion, it preferred the use of fixed-satellite service bands, noting that second generation maritime satellites and INMARSAT planning indicated a strong preference to use 6/4 GHz. The aeronautical community opposed our suggestion. In our Eighth Notice, we proposed RR No. 378B which provided a shared primary allocation of portions of the 6/4 GHz fixed-satellite bands (4180-4205 MHz and 5920-5945 MHz) as feeder links for maritime mobile-satellites. That proposal also overlapped an adjacent radionavigation band in part (i.e., 4200-4205 MHz). Comments of the Maritime Service Working Group (M-SWG) emphasized the need for a primary allocation for feeder link frequencies to

reduce significant frequency coordination problems with the fixed-satellite service networks and strongly recommended the bands 4180-4200 MHz and 6410-6425 MHz. These are already allocated under the Radio Regulations to the fixed-satellite service; the same is not true of the bands proposed in 378B. COMSAT General also supported these as preferred bands but cautioned that interpretation of proposed footnote 378B could imply "...that remaining fixed-satellite service allocations are not available for maritime mobile-satellite feeder links. If interpreted in this manner, proposed RR No. 378B would restrict rather than expand the fixed-satellite service bands available for use for such feeder links." Among other things, we have examined the maritime mobile-satellite feeder link problem in conjunction with feeder link needs of other services (e.g., broadcasting-satellite), needs of the conventional fixed-satellite service, and the fear raised by COMSAT General in its comments. We have removed RR No. 378B. Our objective is to allocate sufficient spectrum to the fixed-satellite service in order to enable successful coordination of fixed-satellite networks and those requiring fixed-satellite service frequencies for feeder links.

153. Frequencies for use between ship and satellite are allocated to the maritime mobile-satellite service between 1535-1660 MHz. In our Fifth Notice, we asked whether or not the band 1535-1660 MHz should be re-adjusted to accommodate foreseen maritime mobile-satellite increased needs. We also proposed 1710-1720 MHz and 1970-1990 MHz as additional allocations for a maritime mobile-satellite system to be used for high data rate applications. Response from the aeronautical community opposed re-adjustments of 1535-1660 MHz. Maritime comments preferred spectrum adjacent to existing allocations for operational and technical reasons but favored our proposal at 1710-1720 MHz and 1970-1990 MHz in the event preferred allocations could not be proposed. Our Eighth Notice proposed re-allocation of 1535-1660 MHz by reducing exclusive allocations for aeronautical mobile-satellites by 6 MHz and expanding shared allocations to aeronautical mobile-satellite and maritime mobile-satellite services by that amount. We felt that each mobile-satellite service would have exclusive spectrum to meet initial needs, and that the shared allocations would be available for assignment on approved application by either service at some future time when need would be demonstrated and after prior operational coordination between the two services. We also continued our proposals for 1710-1720 MHz and 1970-1990 MHz. In response to our Eighth Notice, the aeronautical community preferred an allocation proposal advanced at the International Civil Aviation Organization (ICAO) Communications Divisional Meeting. That proposal would re-adjust the 1535-1660 MHz band and provide for aeronautical- and maritime mobile-satellites at the expense

of other aeronautical services. The Maritime SWG and COMSAT General pointed out practical difficulties with ICAO's plan, particularly in regard to reduction of the 101.5 MHz separation frequency between uplinks and downlinks to 95 MHz. COMSAT General stated that ICAO's plan would require eventual modification of terminals, and might adversely affect the rate of installation of ship terminals and the use of maritime mobile-satellite services. Instead, the maritime community proposed allocations of 1535-1550 MHz and 1631.5-1651.5 MHz for the maritime mobile-satellite service. While this proposal would satisfy maritime estimates of its full needs, the aeronautical mobile services requirements could not be met except by adjusting bands immediately above 1660 MHz. Adjustments above 1660 MHz would adversely affect the radio astronomy service as well as fixed and mobile services in Regions 1 and 3.

154. Our proposed table re-adjusts the 1535-1660 MHz bands along the lines recommended by ICAO. It provides for maritime mobile-satellite needs of 15 MHz downlink and 20 MHz uplink. Frequency separation between bands is 94 MHz; this assumes the 1624-1629 MHz band would be used for uni-directional requirements in the ship-to-shore direction. It also preserves the existing 101.5 MHz frequency separation between bands presently allocated since existing maritime mobile-satellite allocations are included in the proposed allocation. This would ease transition to the new separation frequency and should not inhibit the growth of the maritime mobile-satellite service. The table also provides a common separation frequency (94 MHz) for uplink and downlink bands of the aeronautical mobile-satellite and maritime-mobile satellite services and for the mobile-satellite service. We have withdrawn our proposal at 1710-1720 MHz and 1970-1990 MHz.

155. COMSAT General also stated that it "...has received numerous inquiries whether the MARISAT system could be used by transportable terminals located on land in remote areas where other means for providing services in an efficient and economic manner are lacking." COMSAT General recommended that a new regulation be added to permit such service. We do not propose to introduce any provision which would permit such service. Proposals for a satellite service between points on land have been discussed and are provided elsewhere in our table. Maritime mobile-satellite allocations are proposed worldwide for service to and from ships.

Meteorological-Satellite

156. In the Third Notice, we proposed, at the request of the Executive Branch, additional spectrum for the meteorological-satellite service. This service provides weather information worldwide to users who receive it from satellites with relatively low-cost earth terminals. The present allocations were maintained, but an additional exclusive worldwide allocation within the 1700-1710 MHz band was proposed for this service. All other radio services were proposed to be deleted from this band in order to avoid any interference or coordination conflicts that could result. No objections to this proposal had been raised in the U.S. and it was continued in the Fifth Notice as originally proposed.

157. The Eighth Notice indicated that there was considerable opposition to this proposal expressed by European administrations with respect to the deletion of the fixed service in this band. Consequently, we proposed to reinsert the fixed service into the 1700-1710 MHz band in Region 1, but only on a secondary basis. The secondary allocation was proposed to avoid the difficulties of coordination that are required when services share equally. Also, previous experience with the fixed service operating in the 1690-1700 MHz band on a secondary basis without interference, indicated that this was a viable option. Since no objections to this proposal were received in response to the Eighth Notice, this proposal has been continued without change herein.

Space Radars/Space Electronic Measuring Equipments

158. In the Third Notice, we identified a national requirement for multi-frequency radars that would be used for the measurement of rain drop size, rain cloud echo, and melting-layer height mapping. These radiolocation operations using space techniques were to be conducted in support of the space research and earth exploration-satellite services. There was also a requirement to satisfy the need for imaging radars of future space missions. Regulation No. 346A was proposed, at that time, to satisfy the requirements within the bands 1215-1400 MHz, 3100-3300 MHz, 5250-5350 MHz and 9500-9800 MHz, provided that harmful interference would not be caused to terrestrial radiolocation, and, in the 1215-1240 MHz band, to the radionavigation satellite service also. In the Fifth Notice, this

regulation was continued with only 1215-1400 MHz changed to 1215-1300 MHz because of a reduction in the requirement.

159. Subsequent to the issuance of the Fifth Notice, it was determined that these space radars would not be compatible with other Executive Branch systems operating in some of the proposed frequency bands. Furthermore, there appeared to be two basic functions that these radar-like devices were to perform: (1) measurement of the environment; and (2) radiolocation. Therefore, in the Eighth Notice, the regulation was deleted from the allocation table; however, in the text of the Inquiry, two categories were defined and discussed as still under study: (1) space radars; and (2) space electronic measuring equipments. The space radars would be required for spacecraft docking, launch of spacecraft from shuttles, rendezvous, planetary landings, and interplanetary navigation; the frequency bands that were desired for these types of functions are the 3100-3300, 5250-5350, and 9500-9800 MHz bands. The space electronic measuring equipments would electronically measure the Earth's environment, with desired operations in the 1215-1300, 3100-3300, 5250-5350 and 9500-9800 MHz bands. The requirement for these operations to co-exist on a co-equal basis with the existing Executive Branch radio services in the identified bands remains difficult to accommodate. Consequently, we are proposing that these operations be limited to radiolocation bands on a secondary basis to other services under footnote 365A/345A which reads: "Radars located on spaceborne platforms may be operated on a secondary basis in the bands 1240-1300 MHz, 3100-3200 MHz, 5250-5350 MHz, 9700-9800 MHz and 13.4-14 GHz."

Amateur/Amateur-Satellite

160. In response to the Second Notice, the Amateur Radio Service Working Group requested that the present allocations at 1215-1300, 2300-2450, 3300-3500, 5650-5925 and 10000-10500 MHz be maintained, and that a small portion of these amateur bands also be allocated to the amateur satellite service in order to permit experimentation with space communications techniques. They pointed out that a 2304.1 MHz beacon on the Oscar 7 satellite cannot be utilized because the international allocation was lacking. In the Third Notice, we proposed to add the amateur satellite service to the bands 1290-1300, 2310-2320, 3400-3410, and 5650-5670 MHz on a secondary basis. The amateur allocations had been maintained as requested.

161. In the Fifth Notice, the amateur service was proposed for deletion in the 1215-1240 MHz band because of the safety-of-life feature of the radionavigation satellite service proposed for the band. The 2310-2320 MHz proposal for the amateur-satellite service

was shifted to the 2390-2400 MHz band to preclude conflicts with mobile service requirements and other services in the band. Although comments to the Third Notice expressed a desire to include an amateur satellite allocation in the 10.0-10.5 GHz band, this request was not satisfied because of the sharing difficulties with radars that are extensively used in that band.

162. In the Eighth Notice, we modified RR No. 320A in order to include allocations for the amateur satellite service in those bands where the service would share with other radio services in addition to the amateur service. In addition, the amateur satellite proposals for the 3400-3410 MHz band were deleted as being incompatible with the fixed satellite allocation in that band; and the amateur-satellite proposal at 1290-1300 MHz was shifted to 1250-1260 MHz in order to provide greater compatibility with some sensitive radar systems operating in this portion of the band.

163. In this Report and Order, we are continuing our Eighth Notice proposals for the amateur and amateur satellite services except that RR No. 3644/320A has been modified to include (earth-to-space) direction indicators on the 1250-1260 MHz and the 5650-5670 MHz bands. This modification is needed to resolve potential interference conflicts with Executive Branch agency equipments that operate in these bands.

Fixed

164. No changes in allocations affecting our domestic point-to-point microwave service have been proposed below 10.7 GHz. Bands adjacent to the existing allocations were examined without success to determine the feasibility of expanding the allocations. The current allocations for point-to-point microwave are being extensively used, especially in the metropolitan areas; but we see no way of satisfying the demand for more communications facilities by allocation of additional spectrum to this service below 10.7 GHz. We are hopeful that some of the future communications needs can be met through new technology, such as the development of single sideband modulation of microwave transmitters, the development of fiber optic transmission systems, and the use of local transmission systems on frequencies above 10.7 GHz.

165. We are proposing that the band 3300-3400 MHz be allocated for fixed and mobile services on a secondary basis in order to obtain spectrum which could be made available domestically for services such as local television transmission and multipoint distribution. The feasibility of effectively sharing this band with radiolocation

and amateur on a nationwide basis has not been fully explored; however, we feel that there is a good possibility of using this band in certain locations without interference to the radiolocation facilities.

166. The Association of American Railroads (AAR) argued that extensive use by the railroads of the bands 1850-1990, 2130-2150, 2180-2200, and 6575-6875 MHz would be impacted by our proposals for the addition of the fixed-satellite (earth-to-space) service to the heavily congested 6575-6875 MHz band. We believe that sharing criteria being proposed through the CCIR forum will permit the fixed-satellite (earth-to-space) and earth exploration-satellite services to operate in these bands without interference to the existing services.

Radio Astronomy

167. The radio astronomy community's major concerns in this portion of the spectrum were the expansion and protection of continuum observation bands in the vicinity of 2700 MHz and 5000 MHz, and the protection of observations on the important hydrogen spectral line in the vicinity of 1400 MHz.

168. Throughout this proceeding the Radio Astronomy Service Working Group (RASWG) and National Academy of Sciences (the Academy) have stated that the present radio astronomy band at 2690-2700 MHz is about one-half of the size desirable for continuum measurements and that observations in the band were subject to interference from the broadcasting-satellite service in the lower adjacent frequencies. In the Third and Fifth Notices, the proposed table included the radio astronomy service in the band 2670-2690 MHz. The table of the Third Notice also proposed deletion of broadcasting-satellite; but arguments convinced us that the broadcasting-satellite service did need the spectrum and it was restored in the Fifth Notice. We asked the respondents to consider possible solutions. One possible solution presented by the Notice was allocation of a band for continuum observation at 3325-3355 MHz, but the radio astronomy community was not supportive of that proposal because it would interrupt the sequence of long-term observations made at 2690-2700 MHz, and because there could be unforeseen sharing difficulties with services in that region of the spectrum. In the Eighth Notice, we reported that the Radio Astronomy and Broadcasting-Satellite Service Working Groups had developed a domestic agreement which could permit both services to operate in that portion of the spectrum. The international proposal is contained in new RR No. 3726A/364I which urges administrations

to take all practicable steps to protect radio astronomy observations in the band 2670-2690 MHz. The basic domestic action would be to begin implementation of the broadcasting-satellite service at the frequency 2500 MHz and then to proceed to the higher frequencies. The broadcasting-satellite service would operate under a power flux density limit and would cease transmissions if harmful interference were caused to the radio astronomy observations. Comments in response to the Eighth Notice supported this agreement, and we are submitting the proposal for RR No. 3726A/364I herein.

169. The RASWG, in its initial report to the Commission and in its comments to the Notices, and the Academy in its comments to the Notices placed a very high priority on the protection of observations of the red-shifted hydrogen spectral line below 1400 MHz. Observations of the line provide information on the dynamic histories of galactic systems and permit evaluation of cosmological theories. The RASWG and the Academy believe that an exclusive allocation to the radio astronomy service in the band 1370-1400 MHz is the most desirable way to insure that the scientific research could be accomplished. A less desirable alternative would be a shared primary allocation in the band. We are proposing to modify RR No. 3680/349A which concerns protection of radio astronomy observations of the displaced hydrogen line as suggested by the RASWG by placing the lower limit of consideration at 1330 MHz. The presently planned uses of the band by the radiolocation service do not allow for the provision of a greater degree of protection at this time; however, it is reasonable to ask administrations to take into account the radio astronomy service in their future plans. We are proposing Recommendation No. AA relating to the use of the band 1330-1400 MHz by the radio astronomy service which suggests such action.

170. We also received a number of comments regarding protection of observations in the search for extraterrestrial intelligence (SETI), the particular frequency band of concern being 1400-1727 MHz. This band contains the molecular hydrogen (H) line and a number of hydroxyl (OH) lines and may be seen as significant by water-based life forms. The numerous comments received with regard to SETI requested that the band 1400-1727 MHz be reserved exclusively for this operation. The CCIR has concluded that sharing between a SETI receiving system and Earth-based transmitting systems is probably feasible in most cases with appropriate coordination, and that sharing between a SETI receiving system and spaceborne or line-of-sight airborne transmitting systems is not feasible. The present uses of the band 1400-1727 MHz, and the uses planned for the near future, preclude

a proposal for reservation of the band for SETI. We are proposing RR No. 3684A/351 in order to ask administrations to bear in mind that such research is taking place; in addition, we are proposing Recommendation No. BB which would ask administrations to take into account SETI in their future planning for the band 1400-1727 MHz.

171. We cannot propose an expansion of the 5000 MHz continuum band for exclusive radio astronomy use because of important Executive Branch operations, (which could include aeronautical operations). However, we are proposing a secondary allocation at 4950-4990 MHz along with RR No. 3531/233B which urges administrations to take all practicable steps to protect the observations.

172. Finally, we are proposing RR No. 3732A/369A to obtain protection of observations of the carbon hydride spectral lines in the vicinity of 3300 MHz, and we are proposing to modify other regulations concerning the observation of spectral lines in order to urge administrations to protect observations. These changes were requested by the RASWG and no adverse comments were received.

Mobile

173. In past Notices, we discussed flight test telemetry requirements for the bands 1435-1535 MHz and 2310-2390 MHz. RR No. 349C was proposed for these bands. In our Eighth Notice, we retained a primary allocation for radiolocation in the 2300-2390 MHz band for the satisfaction of national requirements and also retained existing allocations for space services at 1525-1535 MHz. AFTRCC comments to the Eighth Notice continued to request that no space services be allocated to 1435-1535 or 2310-2390 MHz, that radiolocation be allowed only on a secondary basis to mobile in the band 2310-2390 MHz, and that proposed footnote 349C be revised to read as follows:

> "In region 2 where the mobile service is authorized in the bands 1435-1535 and 2310-2390 MHz, the use of this allocation is by the aeronautical mobile service for flight test telemetry."

174. Our table proposes no space services in the 2310-2390 MHz band for the reasons stated in earlier Notices. Only the 1525-1535 MHz band continues space service allocations for existing services. AFTRCC's comments concerning the need for flight test telemetry have convinced us to provide a primary mobile service allocation in RR No. 3680A/349C. However, the primary radiolocation allocation at 2310-2390 MHz has been maintained to meet Executive Branch needs.

Existing national coordination procedures are adequate to insure effective use of the band without degrading either primary service.

Maritime Mobile

175. In past Notices, we discussed future maritime communications systems pertaining to the safety of ship movement and the protection of life, property and the environment. These systems include remote control of various vessel operational functions, collision avoidance, tug-tow telemetry and telecommand, ship-to-shore interface communications for handling dangerous cargoes, deep water ports communications, surveillance and other ship-to-ship interrogation, and voice and record communications between ships and between ship and shore. The band 10.55-10.68 MHz was noted as the first appropriate frequency band available above 960 MHz and a band where required protection from harmful interference could be provided. RR No. 404C was discussed in our Fifth and Eighth Notices as appropriate for proposed systems to operate in this band. However, because of a passive sensor requirement, which had also been identified for the band 10.6-10.7 GHz, and the inability to find satisfactory sharing arrangements with these sensors, we proposed no allocation changes. After further study of the issue, we believe that the passive services should be able to successfully share with the active terrestrial services. With respect to RR No. 3783B/404C, we do not feel that the request for 130 MHz has been fully and adequately justified. By placing this regulation against the band, future flexibility would be greatly reduced. We are proposing to maintain the present primary fixed allocation, and we add maritime mobile on a primary co-equal basis. Additionally, after further study, we feel that maritime mobile safety requirements should be protected from harmful interference in 5 MHz from 10.550-10.555 GHz. This we have done in proposed RR No. 3783B/404C.

176. We also discussed radar beacons and shipboard transponders at 2900-3100 MHz and 9300-9500 MHz. Radar beacons are used to identify selected navigational aids and off-shore structures; shipboard transponders offer a collision avoidance capability and facilitate bridge-to-bridge communications. The aeronautical community also uses 9300-9500 MHz for airborne weather radars and ground based radar beacons. Comments to the Fifth Notice led to our Eighth Notice proposals of RR No. 3730/367B for 2900-3100 MHz and RR No. 3776/399 for the 9300-9500 MHz band. Comments from both aeronautical and maritime communities agreed with these proposals; however, ARINC/ATA comments, in the light of ICAO's Communications Divisional Meeting, suggested clarifying RR No. 3776/399. We agree that the ICAO version does not change the substance but improves the language and, therefore, we have included it in our proposals herein.

Mobile-Satellite

177. At the time of the Third Notice, we attempted to satisfy a requirement of the Executive Branch to use earth stations on land at fixed points, on moving objects on land, on aircraft, on ships, and on other moving platforms all operating at the same frequency. This required the proposed allocation of frequency bands to both mobile-satellite and fixed-satellite services. In the Eighth Notice, this requirement was satisfied in the bands 7250-7750 MHz and 7900-8400 MHz for worldwide use. We are continuing this proposal for the mobile-satellite allocations herein.

Industrial, Scientific and Medical

178. In earlier Notices, we discussed the possibility of providing harmonically related frequencies for ISM applications as suggested by some respondents. At that time, in consideration of the other services which may be affected, it was not found possible to provide the harmonic relationships desired. This is still the case, and we, therefore, are proposing no change to the existing frequencies for ISM in this portion of the spectrum.

179. In response to the Third, Fifth and Eighth Notices, Litton Microwave Cooking Products and others requested an ISM band around 10 GHz. In comments to the Third Notice, they specifically requested 10.6 GHz ± 100 MHz and in response to the Fifth Notice, suggested that an international band at 9800 MHz would be preferred. We have been unable to accommodate this request for an allocation at either suggested frequency because ISM operations (including microwave ovens) are considered to be incompatible with existing and planned services for both bands.

180. In the Third, Fifth, and Eighth Notices, we considered a new regulation to be applied to the frequency 2450 MHz which would allow the wireless transmission of energy from space on that frequency. The Fifth Notice proposed to reduce the allowable bandwidth from plus or minus 50 MHz to plus or minus 10 MHz, and the Eighth Notice proposed to restrict the direction of emission to space-to-earth and space-to-space only. We are continuing the proposal as contained in the Eighth Notice to the Conference, as shown in Appendix 5 herein.

Sub-Section III. F.

Spectrum Between 10.7 GHz and 40 GHz

181. This portion of the spectrum should witness intensive development and implementation of technologically novel telecommunication systems in the coming years. Our problem has been to develop proposals for allocations which are flexible enough to permit experimentation, development, and implementation, and yet which are ordered enough to permit rational planning for use of the spectrum.

182. Four major problems have arisen during the course of this proceeding. First, there has been a need to provide adequate spectrum for the fixed-satellite service in the frequencies below 20 GHz in order to accommodate international and domestic United States requirements. Second, there has been a need to provide for passive earth sensors at specific frequencies without adversely affecting the development of other services. Third, there has been a need to provide allocations for the mobile-satellite service in order to satisfy Executive Branch requirements. And, fourth, there has been the complex problem of accommodating the requirements of both the broadcasting-satellite and domestic fixed-satellite services in the vicinity of 12 GHz. We have attempted to put forth proposals which will meet our foreseeable requirements in each of these critical areas.

12 GHz Domestic Fixed-Satellite/Broadcasting-Satellite

183. Many parties (such as the Fixed-Satellite Advisory Committee, Broadcasting-Satellite Advisory Committee, Satellite Business Systems, COMSAT, COMSAT General, AT&T, and Hughes Aircraft Company) have commented extensively throughout this proceeding on the use of the 12 GHz frequency band. Additionally, the recent SPM considered a number of issues concerning this band and made certain conclusions regarding its future use. Several parties submitted that: (a) there exists a requirement for 20 or more orbital locations in the 12 GHz band for the fixed-satellite service to meet the domestic needs of North American countries, and that (b) as few as four orbital positions may be theoretically available if one makes a number of pessimistic assumptions. These assumptions derive from the interim provisions of the Final Acts of the 1977 Broadcasting-Satellite Conference, which included certain technical criteria, a broadcasting-

satellite allotment plan for Regions 1 and 3, and a plan for segmentation of the orbital arc between the fixed- and broadcasting-satellite services.

184. In order to accommodate projected requirements for each of these space services, in light of the Final Acts of the Broadcasting-Satellite Conference, a number of alternative approaches have been advanced by various parties. A theme common to a number of these alternatives is that of separating the two space services in frequency; that is, to provide separate 500 MHz wide allocations for each of these space services. The greatest divergence of opinion lies in specifying which of the two space services should be removed from the place it currently occupies in the allocations table. Virtually all commenting parties which appear to have an interest in providing fixed-satellite services in this part of the spectrum supported the concept of moving the broadcasting-satellite service to the 12.2-12.7 GHz band. The most persuasive argument reflects the fact that there is currently extensive development of the fixed-satellite service in the 11.7-12.2 GHz band. Consequently, this service would incur a large financial burden, as well as extreme operational implementation problems, if future generations of the fixed-satellite service were forced to relocate to the 12.2-12.7 GHz band. Additionally it was argued that the broadcasting-satellite service would be more compatible with the existing terrestrial services in the 12.2-12.7 GHz band. It was further argued that, following adoption of channelization plans for the broadcasting-satellite service, the terrestrial fixed services could also adopt appropriate channeling which would allow sharing in common geographic areas with the broadcasting-satellite service. Such sharing, it was contended, would not be possible with the fixed-satellite service because of the types of services being contemplated for this part of the spectrum (viz., user premise located receiving/transmitting terminals operating in a random access mode over all or a large part of the 500 MHz bandwidth so as to be able to accommodate large numbers of users).

185. Those parties commenting who expressed an interest in implementation of a broadcasting-satellite service in this part of the spectrum stated a desire to maintain the current allocation for this service, although there was general sympathy with the concept of separating the allocations of the two space services. Arguments presented for maintaining the current broadcasting-satellite service allocation included a desire to maintain an allocation which is compatible with that of the other two ITU Regions, as well as a fear that the sharing of this service with terrestrial services might

place certain restrictions on the development of the broadcasting-satellite service. It was indicated that a proposal to move the broadcasting-satellite service would not be received very well by the international community.

186. We have given careful consideration to the above arguments and have determined that, on balance, it would be in the best interest of the United States to propose separate allocations for these two space services. We have also determined that, while technically not impossible to do so, the sharing of the terrestrial fixed service with the fixed-satellite service (when employing the type of system described above) would impose an administrative/technical complexity which we feel should be avoided if at all possible. (Also under such a sharing arrangement, the extent to which each of the services could develop would be severely restricted).

187. Given the above, we have two alternative methods by which to accommodate the requirements of all services involved. The first would be to move the broadcasting-satellite service into the 12.2-12.7 GHz band, and to provide for geographic/frequency sharing between the broadcasting-satellite service and the terrestrial fixed service. The second alternative would be to move the fixed-satellite service into the 12.2-12.7 GHz band, and concurrently move the terrestrial fixed services down into the 11.7-12.2 GHz band where they would continue to share on a geographic/frequency basis with the broadcasting-satellite service, enjoying the same status as they now possess.

188. We have had to carefully weigh all of the factors mentioned above in arriving at a proposed solution to this most difficult problem. With either choice the impact upon this portion of the spectrum will, if the proposal is adopted, be significant, and will require an extensive, complex domestic implementation proceeding which could have a far reaching impact on the existing terrestrial services. Nevertheless, we feel the proposals made are necessary to accommodate the important long-range requirements of both the fixed- and broadcasting-satellite services in this country. We, therefore, are proposing that the broadcasting-satellite and terrestrial fixed services share the 12.2-12.7 GHz band and that the fixed-satellite service be allocated in the 11.7-12.2 GHz band. Consequently, we are adding RR No. 3707A/4058F to ensure the compatibility of the broadcasting-satellite and the terrestrial services in the 12.2-12.7 GHz frequency band.

Fixed-Satellite

189. As discussed in previous Notices, we have considered the expanding requirements of the fixed-satellite service, especially in the area of international communications, and have attempted to provide additional spectrum above 10 GHz for this purpose. We are continuing the proposal from the Eighth Notice, that the fixed-satellite service be allocated the full bandwidth between 10.7 and 11.7 GHz, and that an additional 500 MHz of bandwidth be provided for an uplink at 12.75-13.25 GHz. Each of these bands is shared quite extensively with terrestrial services in the United States. It is envisioned that the number of fixed-satellite earth stations would be limited to about half a dozen stations, located in places far from population centers, so as not to restrict unduly the further development of terrestrial services. We are proposing RR No. 3789A/405BG to restrict the fixed-satellite use of the 12.75-13.25 GHz to international systems.

190. Current fixed-satellite allocations in the 18 and 30 GHz areas are viewed as necessary for the long-range development of the service and we, therefore, are proposing no change to those allocations.

191. As mentioned in our discussion on the 12 GHz fixed-satellite/broadcasting-satellite issue, we have separated these two space services in frequency. The separation of the downlinks of these two services has necessitated the finding of an additional 500 MHz uplink; this additional uplink will be proposed in the 17.1-17.6 GHz band shared with the radiolocation service. It is envisioned that this band will be utilized for an uplink to the broadcasting-satellite service, although it is our intention to have no such restriction placed on the allocation at the Conference. Several parties have discussed the issue of bi-directional use of the fixed-satellite bands, in particular the 10.7-11.7 GHz band, for this purpose. As mentioned above, this band is used extensively by the terrestrial fixed service. We must agree with the comments of AT&T that the permitted use of the fixed-satellite service in this band in the earth-to-space direction would severely restrict the development of the terrestrial fixed service, especially the utilization of digital techniques, and, therefore, cannot accept any proposal for bi-directional use of this band.

192. COMSAT submitted a proposal to make use of the frequency bands allocated to the fixed-satellite service for interconnecting terrestrial space diversity sites without demodulation and remodulation; this would allegedly provide economy. AT&T opposed the proposal on the grounds that satellite channel plans and terrestrial

channel plans are different. The use of the satellite channel plan for terrestrial interconnection could, according to AT&T, cause interference to terrestrial systems. The COMSAT proposal stemmed from the system design for operation at the Etam, West Virginia, earth station. We believe that the requirement could be handled by domestic frequency management procedures, and that CCIR should continue to study the proposed interconnection of diversity sites. When final agreement is reached in this matter, the situation could then be taken up at a future Radio Conference.

Broadcasting-Satellite

193. The broadcasting-satellite service allocations which we may reasonably expect to be implemented in the near to intermediate time frame are those at 2.5 GHz and 12 GHz. Our intentions with respect to the 12 GHz allocations have been discussed in the section on 12 GHz Domestic Fixed-Satellite/Broadcasting-Satellite.

194. Comments were filed by the Public Interest Satellite Association (PISA) concerning the use of the 12/14 GHz bands by small diameter antenna uplinks in conjunction with a multiple spot beam antenna satellite. Applications of this type in the 12/14 GHz bands, or the 12/17 GHz bands, would not be precluded by the international Radio Regulations if the United States proposals are accepted. However, this type of a service could be severely impacted by the results of the planned Region 2 Broadcasting-Satellite Conference anticipated in the early 1980's. This matter will have to be addressed during the United States preparations for that Conference, and therefore, is not appropriate for detailed discussion at this time.

195. The type of requirement addressed by PISA has, however, received considerable thought and discussion during our WARC preparations. Noting that the future of these types of systems is uncertain with respect to the 12 GHz band, we have considered other possible alternatives for its satisfaction. One possibility is the joint fixed-satellite/broadcasting-satellite allocation in the 2.5 GHz band; this possibility is further discussed in that section of this Report and Order.

196. Comments were filed by several parties looking towards the long range requirements of the broadcasting-satellite service and the additional allocations which may be necessary. Specific requests were made for allocations at 19 GHz to share with the fixed-satellite service, and for an allocation at 23 GHz, where the broadcasting-satellite service is currently authorized only in Region 3.

197. With respect to the proposal at 19 GHz, the results of the 1977 Broadcasting-Satellite Conference have demonstrated that it is extremely difficult for these two services to share common spectrum. This is due principally to two factors. The first of these is an apparent desire of most administrations of the world to adopt pre-arranged plans for the broadcasting-satellite service, and the second is a wide disparity between the possible technical characteristics of each of the services. Because of these factors the fixed-satellite service would likely be severely restricted in its use of these shared bands. In view of these considerations, we believe that separation of these two services in the allocations table is the most prudent course of action and, therefore, cannot accept the allocation proposal. It is worth noting that in our proposals to share the 2.5 GHz band between these two services, the types of service envisioned are quite similar and the dual allocation proposal is designed more to avoid possible definitional ambiguity than to propose two dissimilar services.

198. We have also made an allocation proposal at 23 GHz, extending the current Region 3 allocation to a worldwide status. We believe that at these frequencies the broadcasting-satellite service should be able to successfully share the band with terrestrial users; hence, we have made the proposal as shown in Appendix 5 herein.

Intersatellite

199. The Fixed Satellite Service Working Group, in its initial report, concluded that intersatellite service allocations of modest bandwidth were required below 20 GHz. COMSAT General and COMSAT, in comments to the First Notice, stated that the present intersatellite allocations in the vicinity of 60 GHz could not be utilized in the near future because of economic reasons. Later, the Service Working Group suggested the bands 17.4-17.7 GHz and 22.7-23 GHz. In the Third Notice, we identified an allocation at 22.7-23 GHz where the presence of water vapor absorption should permit sharing with terrestrial services. In the absence of information on intended use and required capacity, that was the only band identified. In the Fifth Notice, we identified an additional band at 21.4-21.7 GHz, at the request of COMSAT and AT&T, that would permit simultaneous communications in two directions. Again, we asked for comments on intended use. In their comments, COMSAT submitted information

associated with analyses done for INTELSAT which indicated a requirement for 1 GHz in each direction. COMSAT suggested several possible allocations including 24.25-25.25 GHz and 31.8-32.8 GHz which had been submitted by INTELSAT to member administrations. We could not agree to that particular suggestion because of intended uses for those bands (the terrestrial radionavigation service is a "safety-of-life" service), but in the Eighth Notice, we did identify bands 22.6-23.6 GHz and 25.25-26.25 GHz for possible use. Radio astronomers commented adversely to this proposal, and COMSAT submitted additional technical and economic information concerning implementation of such an allocation. We are, however, proposing such an allocation herein, noting that this subject is also addressed in the radio astronomy section.

Mobile-Satellite

200. In the Third Notice, we attempted to satisfy a requirement of the Executive Branch to use earth stations on land at fixed points, on moving objects on land, on aircraft, on ships and on other moving platforms all operating at the same frequency. This required the allocation of several frequency bands to both mobile-satellite and fixed-satellite services. We have had no adverse reaction to these proposals. We are, therefore, continuing our proposal from previous Notices for allocations in the 20.2-21.2 GHz and 30-31 GHz bands.

Meteorological-Satellite

201. In the Fifth Notice, an allocation was proposed at 17.9-18.7 GHz for the meteorological-satellite service. Further investigation into the actual requirement revealed that it could be accommodated in a 200 MHz wide band, and we, therefore, proposed in the Eighth Notice, 17.7-17.9 GHz, as having the least impact on the fixed-satellite service. In their comments to the Eighth Notice, COMSAT expressed reservations concerning the sharing between this service and the fixed-satellite service due to a lack of technical data on the operations of the meteorological-satellite service. We understand COMSAT's concern in this matter, but we nonetheless are satisfied that the meteorological-satellite requirement is a valid one which must be accommodated in this part of the spectrum. It has been determined that the sharing of this service in the higher portions of the fixed-satellite band, with the mobile-satellite service, would not be practical, and we must, therefore, reject that suggestion. A frequency band is required for retrieval of high-speed meteorological data by comparatively small-diameter antenna earth stations located at

about four locations in the U.S. This is an important requirement and we are proposing that the 17.7-17.9 GHz band be allocated to the meteorological-satellite service.

Amateur/Amateur-Satellite

202. In its initial report to the Commission, the Advisory Committee for Amateur Radio (ACAR) requested that the present allocations at 24-24.05 GHz (including amateur satellite) and 24.05-24.25 GHz (secondary to radiolocation) be retained. These allocations have been continued throughout the Notices in this proceeding and are retained in this Report and Order.

Space Research and Earth Exploration-Satellite

203. In earlier Notices, we satisfied all the requirements of the space research and the earth exploration-satellite services except at the 10.6-10.7 GHz band and 18 GHz. Those allocations identified in the bands 15.2-15.4, 21.2-21.4, 22.21-22.5, 23.6-24.0, 31.3-31.8 and 36-37 GHz for passive sensor operations and in the bands 12.75-14.2, 14.4-15.35, 16.6-17.1, and 25.25-27.5 GHz for other operations are included in our attached proposals.

204. In the Fifth Notice, we included a NASA proposal on e.i.r.p. and transmitter power limitations in the 10.6-10.7 GHz frequency band which the other users of the band opposed. In this Report and Order, we are proposing to allocate the 10.6-10.7 GHz band for use by the passive sensors along with the current users of this band. However, we are not proposing to include any technical sharing criteria for this frequency band in the Radio Regulations Articles N25 or N26. We are convinced that sharing criteria should be developed and updated by CCIR for use by interested administrations. The sharing criteria for protection of passive sensors in the band 10.6-10.7 GHz have already been adopted by the XIVth Plenary Assembly of the CCIR. In order to provide compatibility for all services operating in accordance with the Table of Frequency Allocations, we are proposing No. RR 3783C/404D which states that administrations shall refer to the technical criteria for sharing between passive and active services presented in the latest CCIR texts when planning, designing, or implementing services in this band.

205. Also in the Fifth Notice, we indicated some proposed sharing criteria in the 18 GHz band. AT&T accepted the technical limits applicable to the fixed service when applied in the middle of the 18 GHz channel plan. COMSAT did not accept the e.i.r.p. density limit for satellite transmissions. It is noted that only large diameter antenna earth stations would be able to operate with the e.i.r.p. density limit proposed by NASA. Small diameter ($d/\lambda < 100$) antenna earth stations, which would be used by the domestic and user-oriented satellites, would not be able to operate with the e.i.r.p. density limits proposed by NASA. Accordingly, we are proposing the frequency 18.6-18.8 GHz for use by the passive sensors; however, we are not proposing to include any sharing criterion in the Radio Regulations Articles N25 or N26 for the reasons outlined in this and previous paragraphs. In order to provide compatibility for all services operating in accordance with the Table of Frequency Allocations, we are proposing a new No. RR 3783C/404D as discussed in the previous paragraph.

Radio Astronomy

206. In their comments to the Eighth Notice, the Radio Astronomy Service Working Group (RASWG) opposed the allocation of the frequency band 22.6-23.6 GHz for the intersatellite service, stating that there would be harmful interference from the intersatellite service to the radio astronomy observations referenced in RR No. 3803A/410D. The proponents of the radio astronomy service have not submitted any technical data or analysis in support of their adverse comments. The intersatellite link, as we understand, will operate with low transmitter power between two closely spaced (5-10° orbital separation) satellites. Because of these technical operating conditions, we believe that there will be no harmful interference from the proposed intersatellite service to the radio astronomy service. As such, we propose the 22.6-23.6 GHz frequency band for use by the intersatellite service.

207. A number of allocation provisions for the radio astronomy service currently exist in the Table of Allocations. The requirement for these provisions has been well documented in previous radio conferences and we are proposing to retain them in the allocations table in the bands between 10.7 and 40 GHz. Two additional requirements have been identified; these are for an allocation for the observation of several spectral lines in the 22-24 GHz range, and an expansion of the allocation at the first atmospheric window at the

millimeter wavelengths for observations of continuum spectra of galactic and extragalactic objects. The proposed allocation of 31.3 to 31.8 GHz to radio astronomy satisfies the latter requirement, while proposed RR No. 3803A/410D satisfies the requirement in the 22-24 GHz range.

Broadcasting

208. CBS filed comments in the Fifth Notice proposing the use of 11.7-12.2 GHz for the introduction of new technology for the terrestrial broadcasting service. As discussed extensively in the section on 12 GHz satellite services, we believe that sharing between the fixed-satellite service and terrestrial services at 12 GHz is not practical. We, therefore, have proposed to eliminate primary terrestrial services from 11.7-12.2 GHz, as well as to move the broadcasting-satellite service up to the 12.2-12.7 GHz band. We believe that the broadcasting-satellite service can share with terrestrial services on a geographical/frequency sharing basis, and have, therefore, proposed that the broadcasting-satellite service share the 12.2-12.7 GHz band with the terrestrial fixed and broadcasting services.

Sub-Section III. F.

Spectrum Above 40 GHz

209. The present international Table of Frequency Allocations provides allocations for the terrestrial services below 40 GHz only. In the spectral region 40-275 GHz, it provides allocations for space services in some bands and leaves other bands unallocated; above 275 GHz the spectrum is unallocated. The allocations for the space services were determined by the 1971 Space Conference which was only competent to consider those services; that Conference, however, also made a number of Recommendations concerning allocations for terrestrial services in the bands between 40 GHz and 275 GHz.

210. In the Second and Third Notices of Inquiry, we solicited comments on the method for allocating this portion of the spectrum. We noted that the Commission was developing a domestic table of allocations (Docket No. 19973) and asked if the international table should be accorded with it; we asked if spectrum should be left unallocated, or if spectrum should be allocated in a general way in broad bands.

211. The comments received were divided. Some parties believed spectrum should be left unallocated for maximum flexibility; others believed that specific allocations would encourage experimentation and development. Some parties opposed the sharing of the same bands as was recommended by the 1971 Space Conference and which occurs in the domestic table. We believe that specific allocations should be provided. The reasons as expressed in the Fifth Notice of Inquiry (para. 188) are persuasive. Namely: (a) a large portion of the spectrum above 40 GHz is currently allocated, and other administrations are expected to propose allocations for the currently unallocated spectrum above 40 GHz; (b) many spectral lines have been identified for the radio astronomy, space research, and the earth exploration-satellite services; (c) developments are currently in progress in several frequency bands above 40 GHz; (d) the allocations table directs users to the appropriate frequency bands for the development of a specific service, thereby preventing the wasting of funds and promoting orderly spectrum management. Finally, it is not certain that another WARC will be convened within the next 20 years that will be competent to deal with this spectrum above 40 GHz. Hence, we have provided specific allocations in our proposals between 40 and 300 GHz. Specific allocations above 300 GHz have not been proposed.

212. Although some of the comments requested exclusive allocations for specific services in the 40-300 GHz band, our experience at lower frequencies convinces us that terrestrial and space services can share the same frequency bands. Therefore, our proposal largely reflects the domestic table with most differences resulting from consideration of the Executive Branch requirements.

Fixed-Satellite

213. In response to the Second Notice, the commercial satellite community (COMSAT, COMSAT General, the Fixed-Satellite Service Working Group) identified requirements for exclusive fixed-satellite service allocations in the bands above 40 GHz. In the Third Notice, most of these requirements were accommodated in the bands requested, but the allocations, in most instances, were shared with terrestrial users. We noted that sharing was feasible in the bands below 40 GHz and that we considered shared allocations between the space and terrestrial users to be feasible above 40 GHz. However, we did request additional studies on the matter. In response, some comments still registered doubts concerning the feasibility of space and terrestrial users sharing bands. COMSAT commented that some spectrum should be set aside for exclusive space or terrestrial use and other spectrum should be shared. The proposals were continued in the Fifth Notice essentially unchanged. Responses to the Fifth Notice requested that the fixed-satellite allocations be paired by placing direction indicators with the proposed allocations. In the Eighth Notice, we accepted this suggestion and placed direction indicators on all fixed-satellite proposed allocations. In addition, we separated the proposed allocation at 76-84 GHz into two bands, 71-74 GHz and 81-84 GHz, with the latter for the space-to-earth direction and the former for the earth-to-space direction.

214. In response to the Eighth Notice, COMSAT suggested that the fixed-satellite service be added to each frequency band above 40 GHz proposed for the fixed service. We have satisfied to the fullest extent the apparent requirements of the fixed-satellite service above 40 GHz. We have not seen sufficient justification for sharing by the fixed-satellite service of every frequency band above 40 GHz proposed for use by the fixed service. The 1971 WARC-ST allocated a considerable amount of spectrum to the fixed-satellite service. The total spectrum, above 40 GHz, proposed is considerably more than that allocated by the 1971 WARC-ST, and, we believe sufficient to meet anticipated requirements. Therefore, the fixed-satellite service allocation as proposed in the Eighth Notice has been continued herein.

Intersatellite

215. The foreseen requirements for the intersatellite service above 40 GHz can essentially be met by the amount of spectrum in existing allocations in the table. In the Third Notice, we proposed to accommodate some passive requirements of the earth exploration-satellite and the space research services which were considered incompatible with the intersatellite service. Therefore, the intersatellite allocations at 105-130 GHz were

shifted to 116 to 140 GHz and a 2 GHz segment (174.5-176.5 GHz) was deleted from the 170-182 GHz allocation. Very few comments were received on this proposal in the various Notices. Therefore, the allocations for use by the intersatellite service as modified by the Third Notice have been continued as the proposal for the Allocation Table.

Mobile-Satellite

216. The requirement of the Executive Branch for the mobile-satellite service also in luded several frequency bands above 40 GHz. As in the 10.7-40 GHz spectral region, we have proposed shared allocations between the fixed-satellite and mobile-satellite services. We are continuing in this Report and Order, our proposal for these allocations at 40-41, 43-45, 50.4-51.4, 71-74 and 81-84 GHz.

Broadcasting-Satellite

217. The existing allocations to the broadcasting-satellite service in the 41-43 GHz and the 84-86 GHz bands have received very few comments during this proceeding. No requirements to expand these allocations have arisen. Therefore, these allocations are continued herein without proposed modification.

Amateur/Amateur-Satellite

218. In its initial report to the Commission, the Advisory Committee for Amateur Radio (ACAR) requested that the domestic allocations specified in Docket No. 19973, at 48-50, 71-76, 165-170, 240-250 and above 300 GHz be proposed for the international Table. In our Third Notice of Inquiry, we proposed no change to the existing allocations, but we added allocations at 71-76, 165-170, and 240-250 GHz; the band 48-50 GHz was proposed for use by the aeronautical and maritime services. The amateur community generally supported those proposals but asked that an allocation at 50 GHz be reconsidered. As a result, in the Fifth Notice of Inquiry, we proposed an exclusive allocation at 49.8-50 GHz for amateur/amateur-satellite. The comments supported that proposal. In the comments to the Fifth Notice, both ARRL and ACAR noted that the amateur service could operate with the ISM services in the band we proposed at 120 GHz $\pm$ 500 MHz, and that an amateur allocation at that order would bridge the gap between the proposed allocations at 76 and 165 GHz. Our proposals herein make provisions for the amateur service at 120 GHz. The ACAR also requested, once again, that amateur

be permitted to use the unallocated frequencies above 300 GHz. The proposal to use the unallocated frequencies above 300 GHz has not been accepted. We are not prepared to discuss allocations above 300 GHz. A proposal of this nature may open discussions that may lead to allocations proposals that are considered premature. Due to the realignment of services in the spectral region 71 to 81 GHz to meet the Executive Branch requirements, the proposed amateur allocations were shifted, in the Eighth Notice, to 76-81 GHz from 71-76 GHz.

Space Research and Earth Exploration-Satellite

219. As indicated in our earlier discussions concerning these services, a number of frequency bands are needed for the passive remote sensing of the environment. The frequency bands that are desired are associated with resonance lines of various molecules used for pollution detection, temperature profiling, and other phenomena that are to be measured. Many of the frequency bands of interest extend into the spectral region above 40 GHz. The initial requirement for these services was identified in the Third Notice. In response, in those bands in which we proposed to share these services with the fixed and fixed-satellite services, COMSAT and COMSAT General requested information on the characteristics and the parameters of the services in order to determine the potential sharing impact before they could provide comments on the proposal. In the Fifth Notice, we provided the requested information as defined in a study by NASA of the sharing feasibility of the space research and earth exploration-satellite services with terrestrial and satellite services. It was noted that the conclusion of this study indicated that sharing was feasible between the active services and passive services without placing any restrictions on the active services in these bands. Additional frequency bands were proposed in the Fifth Notice, to satisfy other sensing requirements. Very few comments were received on these proposals. Consequently, except for shifting the proposed allocation in the 71-74 GHz band to the 76-77 GHz band, these proposals were continued in the Eighth Notice. Subsequent to this Notice the Executive Branch has reduced the requirement for 76-77 GHz to 76.0-76.1 GHz. This is reflected in RR No. 3803B/409CE. This Report and Order contains this proposal and continues the other proposals from the Eighth Notice.

Radio Astronomy

220. In response to the Second Notice, the radio astronomers identified requirements for the retention of the allocation at 86-92 GHz, and for new allocations at 105-116 GHz, 182-185 GHz, 217-221 GHz, 229-231 GHz, and 261-272.5 GHz, for the observation of molecular lines. These allocation proposals were accommodated within the Third Notice either through the

allocation of the appropriate bands or through a regulation providing protection to the radio astronomy observations. In response, the radio astronomers requested additional allocations at 48-50 GHz, 95-101 GHz and the 142-150 GHz bands, modifications to the regulation proposal to provide protection from the aeronautical mobile service in the 217-230 GHz band, and deletion of some regulations consequential to the allocation proposals. These requests were accommodated within the Fifth Notice. In the Eighth Notice, we indicated that an additional requirement for the radio astronomy service had been identified at 261-272 GHz. The request was submitted by the National Science Foundation in order to support the observation of broadband black body radiation of astrophysical interest in addition to a number of spectral lines previously identified. We have proposed a primary allocation for the radio astronomy service on a shared basis with the other services in the 261-272.5 GHz band, and modified the previous regulation proposal to accommodate this requirement.

221. The RASWG made comments regarding corrections on some regulations involving spelling of molecular lines and the specific edge of frequency bands. We have accommodated all these comments and modified the proposed regulations accordingly.

Aeronautical and Maritime

222. The aeronautical community (including ARINC, ATA, RTCA, and the Aircraft Owners and Pilots Association) was concerned with the allocations above 40 GHz which provide bands shared with the maritime services. (In the Third and Fifth Notices we proposed an exclusive allocation at 190-195 GHz). In their comments to the Second and Third Notices, they expressed a preference for exclusive allocations because the aeronautical service is generally considered a safety service, because there is a dissimilarity of discipline between the aeronautical and maritime services, and because there is a possibility of incompatible systems being developed. Since there is uncertainty in use of the bands and no comments were received regarding anticipated use, we are proposing shared allocations for the aeronautical and maritime services; we are confident that we can assure development of compatible systems by our participation in both RTCA and RTCM. Because of this same uncertainty as to future use, we are not proposing to restrict the allocations to route (R) operations.

223. The comments in response to our Second Notice were not in favor of sharing the frequency bands above 40 GHz between terrestrial and space services. In the Fifth Notice, we discarded a suggestion by ARINC, ATA and RTCA that satellite operations were merely an extension of terrestrial operations and that satellite techniques be provided through a regulation to the terrestrial aeronautical mobile service. That allocation philosophy

Section IV.

Technical Proposals

Rules for Terrestrial and Space Sharing

225. In the Fifth Notice, attention was directed toward the increasing use of the frequency spectrum and the problems encountered by several services attempting to share the same frequency bands. One of the more complex and inevitable situations is the sharing between terrestrial and space services. Since the potential for interference is perhaps greatest between these types of services, some rules or guidelines for sharing are needed. Comments to this general issue and other specific issues have been carefully considered in developing our proposals for rules applying to sharing between terrestrial and space services.

226. In the Eighth Notice, we proposed to designate 2500-2655 MHz as shared between the broadcasting-satellite, fixed-satellite, and existing terrestrial services by adding the fixed-satellite (space-to-earth) service. We noted that since the intended uses and power levels would be identical to the broadcasting-satellite service, RR No. 3723/364E and Article N28 of the Radio Regulations would require appropriate modification.

227. Several comments were filed on this proposal to modify the Power Flux Density (PFD) limit. Public Interest Satellite Association (PISA), and the National Instructional Telecommunications Council, Inc. (NITC), indicated in their combined comments that the current low-power flux density limitation "...precludes downlink signals powerful enough to make small earth receivers practical. This is important now to protect the ITFS systems, ... who are facing interference from current technology satellites." They interpreted this limit as a barrier to the eventual integration of a high-power satellite and a low-power earth station system. The Public Service Satellite Consortium (PSSC), in their comments, indicated that RR No. 3723/364E of the ITU Radio Regulations should be deleted, thus eliminating any power flux density limit. The Satellite Broadcasting Service Working Group and the Public Service Satellite Consortium (PSSC), recommended that RR No. 3715/361B be modified to include the new fixed-satellite service, in order to have the same PFD limit for that service as for the broadcast-satellite service.

was rejected by the 1971 Space Conference. Comments to the Fifth and Eighth Notices agreed with our proposal to allocate shared bands for the terrestrial and space operations for both the aeronautical and maritime services. RTCM agreed that the flexibility in such allocations would accommodate the uncertainties in projected uses of the bands. Our allocation table, therefore, proposes to add aeronautical mobile, aeronautical radionavigation, maritime mobile, and maritime radionavigation to the bands on a shared basis with the aeronautical mobile-satellite, aeronautical radionavigation-satellite, maritime mobile-satellite and maritime radionavigation-satellite services.

Industrial, Scientific and Medical

224. In the Third Notice of Inquiry, we proposed allocations for ISM use at 55, 120 and 248 GHz as suggested by the International Microwave Power Institute. Litton and Raytheon supported the proposals, but AT&T suggested a frequency near the oxygen resonance line at 60.2 GHz be allocated. AT&T noted that the band 54.25-58.2 GHz, in which we are proposing the fixed service, is attractive to common carrier interests. As a result, we have changed our proposal to provide an ISM allocation at 61.25 GHz, the 25th harmonic of the ISM allocation at 2450 MHz. Very few comments have been received in this proceeding on the other ISM allocations above 40 GHz. We are continuing the ISM allocation proposals herein as contained in the Eighth Notice.

228. Since we desire that satellite operations in this band be limited to small earth terminal/high-power satellites, we agree with the recommendations to modify the PFD limit. However, we do not agree that the PFD limit should be deleted entirely. We are proposing that the fixed-satellite (space-to-earth) service should be limited to the same PFD limit as the broadcast-satellite service in 2500-2655 MHz. Furthermore, since the present PFD limit is barely adequate to provide service to earth stations with 3 meter antennas, as evidenced by the ATS-6 experiments, we propose to relax the limit by 10 dB in order to accommodate one meter diameter antennas envisioned for use at the earth stations. We recognize that this PFD limit could be harmful to the existing terrestrial instructional television systems (ITFS) if it operated on the same channel in the same geographic area. NITC, however, indicated that the satellite system could be integrated into the existing and expanding ITFS network. Therefore, we propose the new PFD limit, while recognizing that any future satellite system must use geographic and/or frequency separation in order to be integrated effectively into the terrestrial ITFS.

229. Since, in the 2655-2690 MHz band we are proposing to retain the fixed-satellite service in the (earth-to-space) direction, there is no need to modify the PFD limit to include the fixed satellite service. In addition, as indicated in paragraph 131 of the Eighth Notice, a compromise had been reached between the Radio Astronomy and Broadcast Satellite Working Groups concerning the use of the band with respect to the adjacent band (2690-2700 MHz) radio astronomy service. We believe it would be inappropriate to relax the PFD limit for the 2655-2690 MHz band in light of this understanding. Therefore, the PFD limit for the broadcasting-satellite service in our proposals has been retained as it exists in the Radio Regulations for this band. All other proposals for Articles N25 and N26 are related to, and consequential to, the allocation proposals for the introduction of satellite services into bands shared with the fixed and mobile services.

Rules for Space Services

230. In the Fourth Notice, we made a proposal to modify Article N27 to tighten the specification for the station keeping of space stations (RR Nos. 6108/470VC and 6109/470VD) from ± 1.0 to ± 0.1 degree in order to provide better orbit-spectrum utilization. COMSAT, COMSAT General, and Hughes concurred with the proposal for the longitudinal direction but opposed the proposal for the latitudinal direction. They indicated

that the tightening of this specification in the latitudinal direction would have little effect upon the efficient utilization of the orbit-spectrum, and that it would result in an unnecessary expenditure of fuel and positioning valve operation. We concur with these recommendations and, consequently, are proposing the ± 0.1 degree station keeping requirement for the longitudinal direction only.

231. Hughes also recommended that RR No. 6110/470VE and the corresponding RR No. 6110.1/470VE.1 be deleted. These provisions state that an existing satellite can drift outside the tolerance band as long as unacceptable interference, i.e., a signal level subject to mutual agreement, is not caused to an adjacent network. Hughes pointed out that the operator of a new unregistered system may not be able to reach agreement with the operator of an existing system, even though the existing system is exceeding the specified station keeping tolerance. It felt that the elimination of these Radio Regulations would require that the interfering station comply with RR No. 3279/115 and cease operation until any harmful interference has been eliminated. We disagree. We believe that the Radio Regulations are sufficient to resolve any disputes of unacceptable interference due to any non-compliance with the specified station keeping tolerances.

232. We also proposed in the Fourth Notice, a specification for maximum spacecraft antenna pointing error (RR 6111/470VF) of ± 0.1 degree in order to provide reduced inter-satellite system interference and reduced unwanted signals in the adjacent territory of another Administration. Again, COMSAT, COMSAT General and Hughes filed comments on this proposal. COMSAT and COMSAT General recommended that the present regulation which specifies 10% of the half-power beamwidth for pointing accuracy be retained for beamwidths greater than one degree and that the ± 0.1 degree pointing accuracy be required only for half-power beamwidths less than or equal to one degree. Hughes recommended that an antenna pointing accuracy requirement of less than 0.2 degree not be adopted. It indicated that a pointing accuracy of 0.1 degree would not be achievable using the conventional earth sensor pointing reference. This level of accuracy would require a ground tracking beacon, with its higher system costs, which in some cases would not be feasible because of geo-political factors. We feel though, that this comment applies to global coverage systems, and we concur with the comments of COMSAT and COMSAT General. We are proposing no change insofar as the 10% pointing accuracy specification is concerned; however, we are proposing to change the second specification to ± 0.1 degree.

233. In summary, we are proposing a tightening of the longitudinal station keeping to ± 0.1 degree and a tightening of the permissible spacecraft pointing accuracy to ± 0.1 degree for half power beam-widths less than or equal to one degree. The remaining portions of Article N27 are considered adequate and we are thus proposing to retain them as presently written.

Efficient Use of the Geostationary Orbit

234. It is important to stress methods to promote the efficient use of the geostationary orbit. The CCIR Special Preparatory Meeting (SPM) recently treated the subject in Chapter 5 of the SPM report. Appropriate proposals in this regard are contained herein.

235. Although the use of Small (diameter) Antenna Earth Stations (SAES) allows lower cost earth terminals in several satellite services, the capacity of the geostationary orbit is substantially affected by such use.

236. The use of Small (diameter) Antenna Earth Stations (SAES) was discussed in the Second, Fourth and, indirectly, in the Seventh Notice of Inquiry in this proceeding. There are several services, such as the fixed-satellite, maritime-mobile satellite, broadcasting-satellite, aeronautical-mobile satellite, (general) mobile-satellite, meteorological-satellite, aeronautical radionavigation-satellite and earth exploration-satellite services, in which SAES are being or would be used. For the domestic fixed-satellite service, it has been our policy to encourage innovative use of this mode of communication by the introduction of SAES while recognizing: 1) the "public interest"; and 2) the efficient use of orbit-spectrum. We have encouraged CCIR studies regarding the use of SAES for various satellite services. The comments regarding SAES received in this proceeding can be divided into the following categories: 1) operations; 2) frequency allocations; 3) regulatory technical standards.

237. The types of operations include: (a) data collection platforms; (b) earth stations on oil drilling platforms; (c) earth stations in remote areas such as in the sparsely populated parts of Alaska; (d) receiving earth stations for cable television systems; (e) broadcasting-satellite earth stations; (f) "two-way" or "interactive" links, particularly with multiple-beam satellite systems; (g) operation of fixed and various kinds of mobile earth stations in the same frequency band(s); (h) earth stations on board ships;

(i) earth stations on board aircraft; (j) earth stations for receiving meteorological/weather data; and (k) earth stations to receive data on earth resources.

238. Various requirements for frequency allocations were stated in the comments. This aspect is treated in our discussions of Article NT/5. It should be pointed out that so far as the fixed-satellite service use is concerned, the consensus of the comments was that no frequency band allocated for the fixed-satellite service should be prohibited from SAES operation.

239. While the use of these smaller antennae significantly reduces costs of the earth segment, it requires increases in satellite power and/or satellite antenna diameter. In addition to higher satellite powers, the use of small antenna earth stations results in off-axis radiation levels which, relative to the main beam level, are greater than those from larger diameter antennas. Consideration was given to the off-axis antenna radiation levels of SAES, but there was no consensus on the numerical values of the antenna radiation levels which could be economically achieved. In order to reduce the number of cases of possible interference, it is necessary to set some limits for off-axis radiation levels. Since there is no consensus on these limits, the most appropriate forum in which to obtain guidelines is the CCIR. We thus propose that the U.S. generally concurs with the results of the CCIR SPM regarding the off-axis radiation levels of SAES.

240. In considering the permissible level of interference between satellite networks, a method of specifying the permissible interference from a single satellite into another satellite as a function of the orbital separation has been suggested and is often referred to as the "scaling law". In the Fourth and Seventh Notices, several possible methods of determining the permissible levels of interference were discussed and among them was the "scaling law". Satellite Business Systems, Western Union, and COMSAT General favored the approach, and Hughes Aircraft opposed it. In addition to a lack of consensus on the desirability of the "scaling law", there was also no consensus of respondents to the Seventh Notice of Inquiry on either the actual values of the single entry interference criterion or the suggested dependence on orbital separation. Independent studies by NTIA and NASA show that application of a "scaling law" would actually increase the orbital separation between the domestic satellites, thus reducing orbital capacity. Based on the lack of consensus on the particulars, or even the desirability of the "scaling law", and in the consideration of the possible adverse results, we believe that the concept should remain in the CCIR for study and do not propose its inclusion in the Radio Regulations.

241. CCIR Recommendation 466 (Doc. 4/1035) which increases the maximum interference level in a telephone channel of the fixed-satellite service, and a new CCIR Recommendation (Doc. 4/1037) which specifies the maximum interference level in a telephone channel of the fixed-satellite service using a digital emission, were both approved by the CCIR XIV Plenary Assembly. In response to the question in the Seventh Notice, as to whether these recommendations should be incorporated into the international Radio Regulations, all parties commenting on this aspect believed that the recommendations should not be in the Radio Regulations but should remain within the CCIR. The basic argument, which we endorse, was that more flexibility would be afforded because the Radio Regulations have historically been subject to change only at widely spaced intervals, whereas changes can be made within the CCIR at least every five years. Several additional comments were made concerning the content of these recommendations; however, they are not appropriate to the 1979 WARC and need to be addressed within the CCIR structure. The CCIR SPM considered the criteria for permissible levels of interference into a satellite from another satellite. We generally concur with the conclusions of the SPM in this regard. However, we are not proposing to introduce the criteria for consideration as Radio Regulations at the 1979 WARC because we do not believe it is appropriate to have interference criteria in the Radio Regulations.

242. Recognizing that efficient use of the orbit entails not only the maximization of the communications capacity of the orbit but also the capability of different services to share, it thus becomes appropriate to consider such issues as limiting power flux densities so as to permit sharing. We have discussed power flux density limits with respect to the 2500-2690 MHz band for the fixed-satellite and broadcasting-satellite services under Rules for Terrestrial and Space Sharing. Changes in PFD limits at other frequency bands have not been proposed.

Guidelines for Optimum Use of the Frequency Spectrum

243. In order to provide for the efficient use of the spectrum and to permit the growth of emerging technology, the use of spectrum-saving methodology is desired to the maximum extent practical. The CCIR SPM treated the subject in Chapter 7 of the SPM report. The output SPM report must be carefully considered in the implementation of efficient spectrum-saving techniques.

Emission Designators and Necessary Bandwidth

244. Within the Radio Regulations, emissions are designated by the necessary bandwidth and classification. Appendix 5 to the Radio Regulations concerns examples of necessary bandwidth calculations for different classes of emissions which are specified in Article 2 of the Radio Regulations. Present Article 2 of the Radio Regulations concerns the Designation of Emissions and specifies how emissions are to be represented.

245. As presently written, Article N3 and New Appendix B of the Radio Regulations require the use of three symbols to classify and to symbolize the emission, preceded by the necessary bandwidth in kilohertz. Because these provisions for designating emissions were adopted at a time when many of the presently common complex emissions were not in use, these provisions cannot express with the three symbol designator of Article N3 all essential information of the newer emissions. Furthermore, the emission designator is important in the evaluation of interference potential, and in some cases it is the only information available by which the purpose and content of a signal can be determined.

246. In the Fourth Notice of Inquiry, a U.S. proposed revision to CCIR Draft Recommendation AB/1 was presented as a proposal to replace Article N3. With respect to the Designation of Emissions, there were few comments to the Notice. Communications Associates were neutral on the proposed Article N3 and the Radio Technical Commission for Marine Services (RTCM) did not believe the revised method would benefit the marine services.

247. The same proposal which was presented in the Fourth Notice, was considered at the July 1977 meeting of CCIR IWP 1/1. As a result of this meeting, IWP 1/1 issued a report which was adopted with minor modifications by the XIVth Plenary of the CCIR.

248. This method of classifying and designating emissions was proposed in Document 1/1039 approved by the CCIR XIVth Plenary Assembly, Kyoto, Japan, 1978. This method was in effect, ratified by the Special Preparatory Meeting of the CCIR in November, 1978, and no changes to it are proposed by the U.S. for the WARC. The CCIR proposals conclude that existing Article N3 be replaced by that portion of Doc. 1/1039 dealing with designation of emissions, and that the WARC consider consolidation of the table of classification of emissions with the method of emission designations.

249. The CCIR proposed method of showing necessary bandwidth is not always in units of kilohertz. The classification of the emission involves the use of three symbols to describe the basic characteristics of the emission and of another two symbols to describe the additional characteristics. This method is naturally more complex than the present (Article N3) method due to the increased number of symbols; but it is considered necessary in order to adequately describe all the complex emissions. We believe that the revised method corrects most of the deficiencies of the present method in designating emissions; thus, we will propose to WARC-79 that the report approved by the Plenary of the CCIR and by the SPM, be adopted as the method of designating emissions.

250. Appendix 5 to the Radio Regulations concerning Examples of Necessary Bandwidths and Designations of Emissions is closely related to Article N3. If changes are made by the 1979 WARC to Article N3, then consequential changes to Appendix 5 would also be necessary. There is concern that Appendix 5 may not reflect current technology. The examples of Appendix 5 are incomplete for composite emissions (A9, F9, P9) of which numbers and complexity have increased significantly since the existing Appendix 5 was adopted. The SPM was able to reach agreement that this matter requires further CCIR study, and noted that necessary bandwidth may be determined by any one of three ways, viz., use of the Appendix 5, computation in accordance with CCIR recommendations, or by measurement. The U.S. does support the SPM report in this regard, as shown in Document P/1040, and does intend to actively participate in future CCIR work in formulating the necessary bandwidth calculations recommendation. Particular attention will be needed for calculation of necessary bandwidths for pulse modulation and digital emissions.

251. In addition to revising the necessary bandwidths in Appendix 5, the revised emission designation as adopted by the CCIR Plenary Meeting has also been used in the Appendix 5 revision by the SPM. This is intended to be an integral part of the U.S. proposals to the WARC. We thus propose that a revised Appendix 5 according to the results of the SPM be incorporated into the Radio Regulations.

Technical Characteristics and Definitions

252. In the Fifth Notice of Inquiry, comments were solicited on definitional matters. The comments received indicated that the present definitions were adequate. The advent of mobile-satellite systems and their inevitable international growth suggest that the

Radio Regulations be expanded to provide for this service as fully as they provide for more established radiocommunication services. Consequential to the rather recent use of such systems is the requirement for definitions which address these uses. Our proposal is to minimize any changes to definitions and to limit any addition of new definitions to the Radio Regulations unless they are absolutely essential. We, therefore, propose changes in RR Nos. 3155/103B, 3156/103C, and 3157/103D as the minimum changes required to eliminate confusion in terms used in coordination procedures and to accommodate the mobile-satellite service.

Frequency Tolerances of Transmitters

253. Frequency tolerances of transmitters in many instances affect the efficiency with which the radio spectrum is used as well as the design, cost and operation of the radio systems. Appendix 3 and Article N4/12 of the Radio Regulations establish the frequency tolerances for transmitters. The current tolerances were developed for equipment which has been in use for many years. Advances in technology, decreases in cost of equipment, and differences in method of operation suggest changes in the bases on which the current tolerances were developed. Hence, the U.S. has considered it desirable to undertake a comprehensive study of the frequency tolerances for the various types of equipment in use today. During the development of the proposed tolerances, the study recognized the influence that a new tolerance will have on spectrum efficiency, considering also the economic and operational cost associated with such changes. Also, it is considered very important that new restrictive tolerances not be proposed based solely on the state-of-art of the equipment. In some instances, the improvement in spectrum efficiency is not great enough to offset the expected high costs required to make the transition to use of more efficient equipment.

254. In the Fourth Notice, we solicited comments on proposals to revise Appendix 3 of the Radio Regulations. Several parties filed comments and reply comments within the time allotted in the context of the Inquiry. In addition to this effort, the Joint Telecommunications Advisory Committee (JTAC) undertook a study of the frequency emission tolerances. The results of this study, along with the comments to this Fourth Notice of Inquiry, were reviewed and evaluated with additional information on Executive Branch equipment, obtained in concert with the National Telecommunications and Information Administration. All these sources of information were evaluated by a joint Commission and Executive Branch committee. Results of this joint evaluation were incorporated into the U.S. submission (Document P/194) to the SPM. Annex II to Document P/194 contains an extensive rationale for selection of appropriate frequency tolerances. This rationale was heavily relied upon by the SPM in determining recommended tolerances for transmitter frequencies. The U.S. proposal for WARC is thus to support the incorporation of a revised Appendix 3 into the Radio Regulations, using values determined by the SPM as incorporated in its output (Document P/1022) in Chapter 8 of the SPM Report.

Spurious Emission Tolerance Levels

255. Spurious emission levels of transmitters have a definite relationship to the severity of unwanted interference that affects the operation of radio equipment in any electromagnetic environment. The reduction of these spurious emission levels can contribute significantly to the reduction of harmful interference from unwanted signals both in and out of band.

256. The present Table of Tolerances for the Levels of Spurious Emissions is contained within Appendix 4 and Article N4/12 of the Radio Regulations. This table provides spurious emission levels for equipment that operates in frequency bands below 235 MHz; for bands above this frequency, the spurious emission levels are to be as low as practicable.

257. In the Fourth Notice, we solicited comments on proposals to revise Appendix 4 and Article N2/12 of the Radio Regulations. Several parties filed comments and reply comments within the time allotted in the context of the Inquiry. The Joint Telecommunications Advisory Committee additionally undertook a study of the spurious emission tolerances. The results of this study, along with the comments to this Fourth Notice of Inquiry, were reviewed and considered with additional information on Executive Branch equipment obtained in concert with the National Telecommunications and Information Administration. All these sources of information were evaluated by a joint Commission and Executive Branch committee.

258. CCIR Study Group 1 adopted at the final Plenary Assembly Meetings a study Programme entitled Spurious Emissions. It recommends that certain related work be undertaken, re-evaluating Appendix 4 of the Radio Regulations and its own Recommendation 329-2. CCIR Plenary Document 1/1049 suggests five studies of a complex nature that should be pursued in this area. The nature of the spurious emissions is a complex area and requires much review, particularly if, as has been suggested, spurious emissions from receivers should also be considered. The U.S. has undertaken a study of the spurious emission levels for radio equipment.

259. We have carefully studied the results of the Plenary Assembly, comments to the Fourth Notice, and the SPM conclusions contained in its output (Document P/1080) in Chapter 8 of the SPM Report. The U.S. supports the SPM report insofar as it goes, but does not believe that the report went sufficiently far in its conclusions, in that the SPM Table of Maximum Permissible Levels of Spurious Emissions ends at 960 MHz. We believe it important to extend this table to at least 15 GHz and herein propose to do so. Determination of the maximum level for spurious emissions depends, of course, on available and foreseen technology. Due consideration particularly to satellite operations in this frequency range is very important because of the potential impact of satellites on terrestrial and satellite communications systems, the general inability to reduce or eliminate spurious emissions from satellites once launched short of turning off the equipment, and the expensive costs associated with satellite operations. Based upon comments to the Fourth Notice, data taken from satellite and other transmitter users, and an assessment of technology now under development, we believe a value of 30dB below the mean power of the fundamental emission without exceeding 100 milliwatts to be appropriate, albeit, a minimum value that we would expect to see raised significantly by a succeeding competent World Administrative Radio Conference after a decade or two.

260. The U.S. proposal for the WARC, therefore, is to make the necessary modifications to Appendix 4 of the Radio Regulations according to and in support of the SPM output report, with the additional proposal that for the frequency range 960 MHz to 15 GHz, a maximum permissible spurious emission tolerance level of 30 decibels below the mean power of the fundamental emission without exceeding 100 milliwatts be specified.

Interference and Tests

261. In response to the Fifth Notice, few comments were received concerning the provisions of Articles N16 and N17 dealing with interference and tests. These provisions are believed to be adequate as they exist now and thus we are proposing no modifications to these articles.

Technical Rules Relating to Special Services

HF Broadcasting Service

262. In the Fifth Notice, the desirability of discontinuing double sideband (DSB) emissions and of limiting HF broadcast

transmitter power was discussed. In response to that Notice, the International Broadcast Service Working Group recommended that standards for international broadcasting not be revised, especially since the ITU Administrative Council decided not to revise articles relating to a single service. In view of the need to alleviate the effects of congestion in the HF broadcast bands, however, it is believed that revisions for improved standards are warranted in Article N28.

263. Thus, in Article N28, we are proposing several technical and operational changes intended to improve the service. Particularly, we have proposed that the use of double sideband emissions shall be discontinued no later than January 1, 1995. This aspect has been reviewed in depth by the SPM. With this intensive review and the work that will be done in the near future by the CCIR, a change to other than DSB will enhance spectrum efficiency.

264. The other major technical change is our proposal to limit the power used by HF broadcast transmitters. Essentially, a limitation imposed on international and domestic HF broadcasting power should make the service more viable to the listening audience and also improve spectrum utilization. We are proposing also to limit spurious emission radiation for the HF broadcasting service in order to decrease harmful interference which may result from excessive spurious radiations.

265. With regard to operations, we see a need to restrict the actual numbers of frequencies used to provide programming to a target area. We have, therefore, proposed that no more than one frequency per frequency band be employed to provide the same program to any single or contiguous zone. The result, we feel, would be improved quality to the listening audience and a better use of the limited HF spectrum.

Aeronautical Radiobeacons

266. A requirement to increase the protection ratio, in decibels (dB), for aeronautical radiobeacons operating in the medium frequency (MF) range has been stated by ICAO. For some time these beacons have been protected at a 15 dB level, instead of 10 dB as presently indicated in RR No. 6476/433. At the ICAO Communications Divisional Meeting in the spring of 1978, it was unanimously agreed to recommend a change in the Radio Regulations to 15 dB. Although comments have not been received on this matter, we believe the requirement to be genuine and in the best interest of the U.S. We are, therefore, proposing that the level be changed to 15 dB.

Radio Propagation and Noise

267. Appendix A concerns the studies and prediction of Radio Propagation and Radio Noise. We believe this appendix is adequate as it now exists. Accordingly, we propose no change to Appendix A.

New Recommendation

268. Proposals have been made to modify RR No. 3661/332A so that the band 620-790 MHz is no longer restricted only to television broadcasting in the broadcasting-satellite service; also, the power flux density limits of RR No. 3661/332A have been deleted. In consideration of these modifications, the new Recommendation No. FF is proposed as a replacement for Recommendation No. Spa2-10, which has been proposed for suppression. This new Recommendation No. FF expands the provisions of Recommendation No. Spa2-10 to have the CCIR study the effects of the various broadcasting-satellite emissions upon the terrestrial broadcasting service.

Regulatory Proposals

IFRB Provisions and Regulations

269. The responsibilities of the International Frequency Registration Board (IFRB) essentially involve the processing, recording, and co-ordination of frequency assignments, the publication and updating of international frequency lists, and the resolution of cases of harmful interference. The functions of the IFRB are defined in Article N9/8 and the operation of the IFRB is explained in Article N10/11.

270. In the Fifth Notice, comments were solicited on the adequacy of Article N9/8 (Co-ordination, Notification and Registration of Frequencies - International Frequency Registration Board) and Article N10/11 (Internal Regulations of the International Frequency Registration Board). Few comments were received regarding these Articles which are generally believed to be adequate. Thus, only minor changes are proposed for Article N9/8, and no changes are proposed for Article N10/11. (See Appendix 17 herein).

Co-ordination and Notification of Space Service Stations

271. In the Seventh Notice, the provisions of Article N11 (co-ordination of stations in the space and terrestrial services) and Article N13/9A (notification of stations in the space services) were discussed. The comments supported the existing procedures; however, several changes are believed necessary. In response to the Seventh Notice, both COMSAT and COMSAT General indicated the need to require more information on the advance publication of an intended space station, more progress reports, and more confirmations to verify the intent. We recognize the concerns expressed, and will closely follow the matter at the WARC.

272. In the Seventh Notice, the desirability of retaining the amateur-satellite service under the provisions of Article N13/9A was addressed. Article N13/9A currently requires administrations to send data on all satellite systems, including amateur-satellites, to the IFRB as specified in Appendices 1A and 1B of the Radio Regulations. In response to the Seventh Notice, the Baton Rouge Amateur Radio Club, COMSAT, COMSAT General, and Western Union indicated that satellite systems should be subject to Article N13/9A. COMSAT General stated that "... it is likely that there will be an increasing number of stations operating in the amateur-satellite service. These stations will be capable of causing interference to stations in other space services, and therefore, we believe they should be subject to the procedural requirements of Article N13/9A."

273. The amateur radio community (ARRL and the Radio Amateur-Satellite Corporation) favors exemption of the amateur-satellite service from the provisions of Article N13/9A, Appendix 1A, 1B for several reasons: (1) stations in the service are not assigned specific frequencies and are able to operate over a band of frequencies, thus making registration and notification inappropriate; (2) stations in the amateur service are not included in Article N12/9, and amateurs have been successfully coordinating the use of amateur-satellites among themselves; (3) RR Nos. 3644/320A, 6362/1567A, and 6105/470V place the burden of avoiding interference upon the amateur-satellite service, thus negating the need for prior coordination/notification; (4) formal protection of the amateur-satellite service is not desirable; (5) it is impossible to comply with the data requirements of Articles N13/9A, Appendices 1A and 1B, in view of the nearly one million earth-based amateur stations which could access amateur-satellites from both fixed and mobile locations. The amateur community would prefer data to be provided in the ITU Journal or the ITU Weekly Circular, and would be willing to accept reasonable requirements for coordination and notification.

274. It is evident the amateur radio community desires international notification of information for amateur-satellite stations but not as it is embodied in the present Article N13/9A procedures. After reviewing the comments received, we agree that strict compliance in providing the data required by Appendices 1A and 1B may be infeasible; however, we do not consider it desirable to completely exempt the amateur-satellite service from the requirements of notification. Thus, a new Resolution No. AA (see Appendix 24) is proposed which allows administrations to supply as much information as possible in compliance with RR Nos. 4100/639AA, 4114/639AJ and 4575/639BA.

275. The procedures of Articles N11 and N13/9A, provide for coordination, notification, and registration of assignments for radio astronomy and space radiocommunications, and exempt stations in the broadcasting-satellite service. The coordination, notification, and registration of stations in the broadcasting-satellite service are provided for by Resolution Spa2-3. As embodied in the Radio Regulations, Spa2-3 is to be used until agreements and plans can be developed for each Region.

276. In response to the Seventh Notice on the adequacy of Articles N11, N13/9A, and Resolution Spa2-3, the Service Working Group on Satellite Broadcasting stated that revisions to these Articles "do nothing toward what is needed by the BSS in bands other than 12 GHz; namely, an adequate long-term replacement for Resolution Spa2-3 and Article 9A." The working group went on to recommend that "Resolution Spa2-3 and Article 9A of the Radio Regulations (RR) and Articles 5, 6, 7 and 12 of the Final Acts of the 1977 WARC-BS, together with their Appendices and Annexes, be systematically reviewed by the Commission in order to consolidate the applicable material into a new Article or its equivalent."

277. Such a consolidation of Articles N11 and N13/9A to include the broadcasting-satellite service was proposed at the 1971 WARC for space telecommunications but met opposition, thus resulting in adoption of the separate procedures of Resolution Spa2-3. We feel that such a proposal to

consolidate Articles N11 and N13/9A and Resolution Spa2-3 would again encounter strong opposition and thus do not intend to include it in our proposals.

278. Several changes which are proposed to Article N11 are for the purpose of clarifying the intent of the Radio Regulations. A modification is proposed to RR No. 4115/639AK of Article N11 in order to allow the addition of earth stations without coordination when such an addition would not result in an increase in interference exceeding an agreed-upon value. Recognizing the imminent growth of mobile earth stations, modifications to Article N11 (See Appendix 18) and new Appendices 28A and 28B (See Appendix 20) are proposed to provide for the coordination of earth stations in the mobile-satellite service. The proposed new Appendix 28A is a procedure for determining the coordination area for a mobile earth station. The proposed new Appendix 28B is a procedure for determing the protection area for a terrestrial station located within the coordination area of an earth station in the mobile-satellite service. In order to facilitate notification of these mobile earth stations, several changes are proposed to Appendix 1A. The provisions of Appendix 1B which treat the advance publication of satellite networks are adequate as stated.

279. In order to improve the notification of stations in the space services, changes to Article N13/9A are proposed which would permit extensions to the time within which administrations must confirm the putting into use of a notified assignment in situations where unforeseen circumstances may have caused such delays. Another proposed change would provide for automatic review of space radiocommunication entries in the Master Register in order to keep entries up to date. The remaining proposals for changes to Article N13/9A are for the purpose of clarifying the intent of the provisions.

280. In the Seventh Notice of Inquiry, comments were also solicited on the adequacy of data required by Appendices 1, 1A and 1B in notifying frequency assignments. Few comments were received and the data requirements were generally felt to be adequate; however several improvements are proposed to the notification data requirements of Appendices 1 and 1A. In examining the usefulness of notified data, it has been determined that the notification of the maximum hours of operation of an assignment is of little value. At present, however, there are no provisions for notifying details on the regular hours of operation of frequency assignments. If this data could be made available to the IFRB , then administrations could use this information to make more efficient use of the frequency spectrum. In order to accomplish this purpose, proposed changes are made to Appendices 1 and 1A which would phase out the notification of the maximum hours of operation and would add a data element to allow notification of the regular hours of operation of an assignment. The proposals for the coordination and notification of space service stations are contained in Appendix 18 herein.

281. We note that the U.S. is continuing to examine possible ways of simplifying and improving the procedures contained in Article N13/9A to meet the needs of all nations. As our studies progress, additional proposals in this regard may be submitted to WARC '79 at a later time. The U.S. is also continuing to study Appendix 4A, particularly in light of the work of the Group of Experts contained in IFRB Circular Letter No. 411 dated 27 April 1978. As our studies progress, additional proposals in this regard may be submitted to WARC '79 at a later time.

Notification of Terrestrial Stations

282. In the Seventh Notice of Inquiry, comments were solicited on the adequacy of provisions for the coordination and notification of frequency assignments to terrestrial stations (Article N12/9 and appropriate portions of Article N11). It was generally felt by respondents that the procedures of Article N12/9 and the portions of Article N11 pertaining to coordination of terrestrial assignments are adequate. All parties commenting on Article 9 felt the provisions were in the best interest of the U.S. Thus, the only proposed changes to Article N12/9 and the terrestrial sections of Article N11 are for the purpose of clarifying the intent of the regulations. (See Appendix 19). We note, however, that the U.S. is continuing to examine possible ways of simplifying and improving the procedures contained in Articles N11 and N12/9 to meet the needs of all nations. As our studies progress, additional proposals in this regard may be submitted to WARC '79 at a later time.

Determination of Coordination Area

283. Appendix 28 to the Radio Regulations specifies the determination of the coordination area around an earth station. The issue of "area-coordination" for transportable earth stations as mentioned in the Seventh Notice of Inquiry has been the subject of considerable controversy. Under the "area coordination" concept, earth stations could be located at any point within an area of operation after coordination with respect to terrestrial station assignments.

284. Most of the objections to this concept centered on the misunderstanding that earth stations would, as a consequence, be afforded preferential status with respect to terrestrial stations over a large area. In response to the Seventh Notice of Inquiry, AT&T, COMSAT, and Western Union all rejected the "area coordination" concept, and only Hughes Aircraft offered positive support.

285. Recognizing that the international use of mobile earth stations in the mobile-satellite service is likely to grow, it appears necessary that some procedure be developed whereby coordination of the mobile earth stations may be accomplished. The concerns of the terrestrial users are also recognized. In order to provide for mobile earth station coordination, while protecting the interests of terrestrial users, we are thus proposing changes to Articles N11, N13/9A, Appendix 1A (See Appendix 18), and new Appendices 28A and 28B (See Appendix 20). They would provide for the coordination of these mobile earth terminals while protecting terrestrial services. The addition of a terrestrial station within the coordination area of a mobile earth station would result in a reduction of the mobile earth station's operating area so that interference would not be caused to the terrestrial station.

286. There has been considerable discussion concerning possible changes to Appendix 28 of the international Radio Regulations which prescribes procedures for determining the coordination area around an earth station that is sharing frequency bands with terrestrial services. As mentioned in the Seventh Notice of Inquiry, the procedures are time-consuming and complex and could possibly be simplified in some cases, and comments were requested.

287. One of the cases involves the reception of video signals; the quality could be described based on a desired carrier to interference ratio (C/I), thus simplifying the calculations of Appendix 28. Both COMSAT and Western Union felt the use of a C/I criteria would be useful, while only AT&T was negative to the use of a C/I ratio. AT&T feels that while the use of C/I ratios might simplify the coordination for earth stations, it would add a greater burden on the fixed terrestrial station operators. We thus propose a modification to Appendix 28 (See Appendix 20) which, as an alternative, allows the use of C/I ratios in computing the permissible interference power for video or digital (excluding telephony) reception subject to the condition that it would not exceed the value computed using the present method.

288. Interference between earth stations and terrestrial stations can occur due to signals scattered by rain, thus there are procedures to determine coordination based on rain-scatter. In the Seventh Notice of Inquiry, it was suggested that rain-scatter coordination might be omitted for areas where there is small precipitation and for systems which can tolerate interference for more than .01 percent of the time. With respect to elimination of rain-scatter coordination there were no adverse comments. Both AT&T and COMSAT supported the idea under certain conditions. AT&T feels that the operator of a video receive earth station should be aware of the risk incurred in omitting rain-scatter coordination, that the specific areas of omission should be specified in Appendix 28, and that

there should be a method of specifying the confidence within which Appendix 28 calculations are made. COMSAT, in reply to the Seventh Notice of Inquiry, conducted an analysis of conditions under which rain-scatter coordination could be omitted. Although we received a generally favorable reaction to this concept, we feel that this concept must be further studied and used before we would be capable of supplying specific proposals. Therefore, we will not make specific proposals in this regard; we will, however, follow the matter closely at the WARC, and as appropriate, support the idea to have the CCIR study the concept.

Interference Between Satellite Networks

289. In the Seventh Notice of Inquiry, comments were sought on changes to Appendix 29 of the International Radio Regulations. In that Notice of Inquiry, we suggested the title of Appendix 29 be changed to "Method for Determining When Coordination is required between Geo-stationary Satellite Networks Sharing the same Frequency Bands". It was also mentioned that the two percent increase in equivalent satellite link noise temperature criteria for initiating Article NII procedures was felt by some to be too stringent and required coordination in an unnecessarily large number of cases. Conversely, others felt that the two percent criterion does protect some sensitive low capacity systems.

290. Comments on this issue were received from COMSAT General, Hughes Aircraft, and Western Union. All three agreed that the 2% "trigger" value should be changed. Western Union feels that sensitive systems do not receive adequate protection and thus would like to see coordination for satellite orbital separations less than 15°. Hughes Aircraft thinks the procedures of Appendix 29 are adequate but would change the "trigger value" to 5% increase in noise temperature in order to decrease the number of coordination cases. COMSAT General, like Hughes Aircraft, feels that the 2% "trigger value" may be too stringent. In their comments, COMSAT General suggested that the CCIR should study how Appendix 29 should be changed to reflect permissible values of intersatellite interference. It pointed out that a trigger based on power density could be in error since interference potential can be overestimated when the interfering carrier does not totally fill the victim receiver bandwidth. COMSAT General endorsed the proposed change to the title of Appendix 29. Although there is no consensus in the comments on the 2% "trigger value" of Appendix 29 except that it should be modified, the CCIR SPM has concluded that the 2% "trigger value" should be changed to 3%. We generally agree with the SPM conclusion and we are proposing that the provision of Appendix 29 and the Annex to Appendix 29 be modified appropriately by WARC '79 to reflect this conclusion. In addition, we are proposing a modification to the title of Appendix 29 to clarify the primary purpose of the Appendix.

Reaccommodation of High Frequency Fixed Service Assignments

291. An issue closely related to the frequency allocation issue is the reaccommodation of high frequency fixed service assignments. (See para. 40 of Eighth Notice of Inquiry). If proposals to reallocate several existing high frequency fixed bands to other radio services are successful, some procedure will be necessary to provide for continued use of displaced assignments. In order to effectively accomplish this reaccommodation, administrations will have to remove those assignments not in use from the Master Register. The responsibility for this reaccommodation should rest with the administration concerned; however, the IFRB should provide some technical assistance. We have provided, in our proposal, guidelines that should be used in the development of this reaccommodation procedure. It is emphasized that only those fixed assignments incompatible with new allocations would require adjustment.

292. At the end of the transition period, possibly 4 to 6 years, all HF Fixed assignments in the Master Register should receive the same common date. (See Appendix 22 herein).

Monitoring, Harmful Interference Procedures and Infringement Reports

293. In the Fifth Notice of Inquiry, comments were solicited on the adequacy of the provisions of the Radio Regulations which concern the monitoring, and harmful interference procedures and infringement reports. Few comments were received on these subjects and the provisions were felt to be generally adequate. A few changes, however, are proposed which should improve the existing Radio Regulations. (See Appendix 23 herein).

294. Article N18 which concerns the international monitoring of radio frequencies is generally adequate as it presently exists. In order to improve the quality of international monitoring, a modification to RR No. 5064/684 is proposed which deletes the provision whereby stations observing lower technical standards than those recommended by the CCIR are permitted. Appendix 6 to the Radio Regulations which concerns Reports of Monitoring Data is adequate as it exists. The only proposed change to Article N19/16, Reports of Infringements, is to RR No. 5100/721, which permits an administration to take action against any station, authorized or unauthorized, over which it has authority. Appendix 7 to the Radio Regulations which concerns infringement reports is adequate as it exists. Several changes to Article N20/15, Procedure in a Case of Harmful Interference, are proposed which will improve the effectiveness of the IFRB in resolving harmful interference cases. The provisions of Appendix 8, Report of Harmful Interference, are adequate and thus no changes are proposed.

New Resolutions

295. In order to implement several of the proposed modifications to the Radio Regulations discussed above, two new Resolutions also are proposed. (See Appendix 24 herein).

296. A new Resolution No. AA relating to the bringing into use of space stations in the amateur-satellite service is proposed. As presently written, the provisions of Articles N11 and N13/9A require the coordination and notification to the IFRB of frequency assignments of all space services (excluding broadcasting-satellite). Due to the fact that earth stations in the amateur-satellite service are not assigned specific frequencies, and because of the widely varying characteristics of the radio equipment, strict compliance with Articles N11 and N13/9A appear infeasible. For any space service, Appendices 1A and 1B specify the data which must be forwarded to the IFRB. The advance publication information (Appendix 1B) for a satellite network can be supplied more readily than can the notification data for the earth station segment (Appendix 1A) of the amateur-satellite service. Recognizing the difficulty involved in advance publication and notification for the amateur-satellite service, proposed Resolution No. AA would allow administrations to supply as much information as possible in compliance with RR Nos. 4100/639AA, 4114/639AJ and 4575/639BA. Such information supplied for Appendices 1A and 1B would be considered complete and would be published in a special section of the weekly circular. As is presently the situation, formal international protection of the amateur-satellite space station assignments would not be required and the burden of avoiding interference would continue to be the responsibility of the amateur-satellite service.

297. New Resolution No. BB is proposed which stipulates that unless special arrangements are made, frequency assignments for a station should be notified by the administration on whose territory the station is located. This resolution is basically an updating of Resolution No. 5 which has been proposed for suppression in Appendix 35. The provisions of this new Resolution No. BB are essentially the same as those of Resolution No. 5 except for the additional references and certain necessary corrections.

Section VI.

Administrative, Operational and Miscellaneous Proposals

Secrecy

298. Few comments were received in response to the Fifth Notice of Inquiry on Article N21/17, Secrecy (of radiocommunications). The provisions of this Article are adequate and serve its intended purpose. The only modification proposed is to RR No. 5193/722 in order to draw attention to related Article 22 of the Convention.

Licenses and Station Identification

299. The provisions of Article N22/18 which concerns licensing of stations were considered in the Fifth Notice. The consensus of comments received was that Article N21/18 is adequate and requires few changes. It is proposed, however, that changes be made to this article in order to allow administrations flexibility in licensing and in complying with the secrecy-of-t communications requirements.

300. Although comments to the Fifth Notice generally supported the existing provisions of Article N23, Identification of Stations, several proposed changes are believed necessary to foster improved spectrum utilization and to provide the flexibility of additional options, for use of identification methods in accordance with CCIR recommendations. Several other proposed changes to Article N23 are for the purpose of aligning the provisions with existing practices and to clarify their intent. Some modifications are proposed to Article N23 to include the use of maritime mobile service identifications which conform with the results of the SPM. Appendix C is considered adequate and no proposals are made.

Service Documents

301. In the Fifth Notice, several proposed changes to Article N24/20 concerning service documents published by the Secretary General, were discussed. The changes proposed to these provisions would enable computer access to the service document information and would preclude the assumption that only hard copy form is available. With the possibility of computer access, significant cost reduction could result. Proposals are also made to delete the requirement that certain, little-used, documents be published. Some of the changes proposed for Appendix 9 are contingent on the proposal to delete certain service documents. In response to the Seventh Notice of Inquiry, in which deletion of Lists IIIA and IIIB for broadcasting stations was

suggested, there was little support for their retention, and thus, lists IIIA and IIIB are proposed for deletion.

302. In order to improve upon the data notified on assignments according to Appendices 1 and 1A, several changes have been proposed. These changes would phase out notification of the maximum hours of operation of an assignment and add a data element for the regular hours of operation for an assignment. Since the data notified in accordance with Appendices 1 and 1A are used to generate documents specified and described in Appendices 9 and 10, consequential changes, including an added Appendix 10A, are required. Proposals are thus made to modify Appendices 9 and 10 and to add an Appendix 10A in order to align these provisions of the Radio Regulations with the proposed changes of Appendices 1 and 1A. The proposed changes for Appendices 9 and 10 and added Appendix 10A are, of course, dependent on the acceptance of the proposed changes to Appendices 1 and 1A.

Miscellaneous Stations and Services

303. In the Fifth Notice, comments were solicited on Articles N30/41, N31, N32/42, N33 and N39, which concern the use of frequencies by amateur and experimental stations, the use of radiocommunications for standard frequency and time signals, for radiodetermination, and for special services relating to safety. After considering the comments received, we have determined that the provisions of Articles N31, N32/42, N33 and N39 are adequate, and thus, we only propose modifications to strengthen and clarify their purpose.

304. In making proposed changes to Article N30/41, it is recognized that administrations may wish to develop their own amateur licensing requirements. Thus, a change is proposed to RR No. 6357/1563 which entails only a recommendation that the operator of an amateur station be able to use Morse code, removing the mandatory provision found in the present Regulation.

Special Rules Relating to Services

305. The comments received in response to the Fifth Notice were generally in agreement with our belief that the provisions of Articles N47 and N29, which concern special rules for the aeronautical mobile and the fixed service are adequate as stated. A modification to RR No. 6323/465 of Article N29 is believed desirable, however, to urge administrations to discontinue the use of double sideband radiotelephone transmissions in the fixed service bands.

Provisions for Medical Transports

306. The United States, along with other ITU administrations, has been requested by the Secretary General of the Diplomatic Conference on the Reaffirmation and Development of International and Humanitarian Law Applicable in Armed Conflicts to make proposals for the international Radio Regulations to provide for the communications requirements of protected medical transports in armed conflicts. These proposals were extensively discussed at the recent SPM and are to be developed by the WARC in accordance with Agenda Item 2.6 to satisfy the requirements for radio identification and communications needs of medical transports. In their present form, the Radio Regulations do not have specific provisions for Medical Transports, even though Article N36/36 specifies procedures for Distress Communications. The provisions of Protocol I of the above mentioned conference were included in the Third Notice of Inquiry; however, no comments were received on this subject. We have considered the request by the Secretary General of the diplomatic conference and the results of the CCIR SPM, and, thus propose additions and modifications (See Appendix 30 herein) to Articles N12/9, N23, N37 and N39. We believe that these proposed changes, which apply to the notification of frequency assignments, identification of stations, urgency and safety transmissions, and special services relating to safety, and the content of the medical transport message, fulfill present and foreseen radio-oriented requirements of medical transports.

Accounting Provisions

307. Our Sixth Notice of Inquiry requested comments concerning proposals of the CCITT Joint Working Party for Maritime Mobile Service for changes in the methods of accounting and operating for public correspondence in the maritime mobile services. Those proposals consist of two draft CCITT Recommendations and draft Regulatory Provisions to amend the Radio Regulations and Additional Radio Regulations. They would restructure the current framework of ITU provisions dealing with accounting and operating procedures for maritime mobile communications by removing from the Radio Regulations and Additional Radio Regulations and placing in the Recommendations all such provisions not requiring continued regulatory status. Additionally, they would make specific changes in maritime accounting and operating procedures to: (1) reduce the number of accounting authorities in each country to which accounts for the services of maritime mobile stations may be sent by setting a maximum number of 25; (2) define the responsibility of each Administration for payment of bad depts incurred by ship stations licensed by it; (3) eliminate by 1988 ship station charges for shore-to-ship traffic from all international accounts; and (4) propose uniform rates for ship stations charges that would be effective until such charges are eliminated in 1988.

308. Three comments were received in response to the Sixth Notice. AT&T supported the CCITT proposals and urged that we recommend U.S. support for their adoption by the 1979 WARC. AT&T asserted that the transferral of existing accounting and operating provisions from the Regulations to the Recommendations would: (1) reduce the workload of future WARCs concerning maritime communications; and (2) make amendment of these provisions easier as changing circumstances require. COMSAT General also supported the work of the Joint Working Party; however, it noted that the accounting and operating provisions involved are generally applicable to the traditional manually-operated maritime services, and stressed the need for Recommendations dealing with maritime accounting and operating procedures which would be applicable to automatic, semi-automatic, and satellite services.

309. Mobile Marine Radio, Inc. (MMR) found that the CCITT proposals represent an improvement over current Regulations with regard to methods of charging, accounting, and refunding. However, it asserted that deficiencies remain in the method of settlement of international accounts when a carrier unknowingly sends a statement for message charges incurred by a vessel to a accounting authority which does not have responsibility for that account. 1/ It stated that, since accounting authorities have six months to verify an account, a carrier has no basis for inquiry as to status of the account during that period and thereafter will find it "virtually impossible" to trace the party responsible for the vessels account. MMR, therefore, submitted that the proposed Recommendations should provide a reasonable time for an accounting authority to notify a carrier that it does not have responsibility for an account presented. Also, MMR submitted that consideration should be given to establishing a more specific time frame for the settlement of accounts, and to have such a procedure apply to those accounts wherein the six month period provided for verification, has elapsed.

310. We believe that the United States should support the Joint Working Party's proposal to transfer from the Radio Regulations to the Recommendations all maritime accounting and operating provisions not requiring continued regulatory status. This will permit easier revision of accounting and operating procedures as may be necessary in the future to respond to changing needs and circumstances. We share COMSAT General's concern for the need to develop further accounting and operating Recommendations for automatic, semi-automatic, and satellite services in the maritime mobile area, and note that the Joint Working Party is now considering such provisions. As for specific problems involving settlement of international accounts, the solutions proposed by MMR may have merit. However, U.S. sponsorship of MMR's proposals, absent thorough consideration of proposals from other U.S. carriers experiencing similar problems, would be premature. We believe that further revisions of maritime accounting and operating procedures should be considered within the context of future CCITT proceedings rather than the

1/ MMR stated that changes from the published list of an accounting authority having responsibility for individual vessels can occur due to changes in chartering arrangements, changes in contractual arrangements between the accounting agency and the vessel owner or agent, and for other reasons. MMR also stated that a given accounting authority may have responsibility for some but not all vessels operating under the name of a particular shipping line or agent.

1979 WARC itself. This will permit the U.S. CCITT Study Group I for Regulatory Affairs to explore any similar problems concerning settlement of international maritime accounts that other carriers and interested parties may be experiencing, and to prepare U.S. proposals offering solutions to these problems for submission to future meetings of the appropriate CCITT Study Groups after the 1979 WARC.

311. Based on the comments received in response to the Sixth Notice of Inquiry, we support the CCITT Draft Recommendations D.90/F.111 and E.190/F.110 except that Article N58/37A, Order of Priority of Communications in the Maritime Mobile Service and in the Maritime Mobile-Satellite Service, should be retained in the Radio Regulations as modified by the CCITT Study Group SMM, under Order of Priority A1 to A12 as well as becoming a CCITT Recommendation. Safety implications require that the article be prominently set forth and have regulatory status. We also support the adoption of the Draft Regulatory Provisions proposed by the CCITT. We believe that the specific changes in accounting and operating procedures proposed by the CCITT in the Draft Recommendations and Regulations will effectuate improved methods of charging, accounting and refunding in the maritime mobile services.

312. Based on the CCITT Draft Recommendations we are proposing suppression of Articles N69/38, N70/39, N72/40A Appendix 21A and Articles 1A, 2, 3, 4A, 5A, 5B, 6A, 7A, 8, 9 10A and 11 from the Additional Radio Regulations. We are also supporting the incorporation of the CCITT Draft Regulatory Provisions into the Radio Regulations as a new Article N62A in the Maritime Mobile Service and Maritime Mobile-Satellite Service Chapter.

Future Conferences

313. As a result of the 1979 WARC, many changes are likely to be made to the Table of Frequency Allocations and to the operational, technical, and administrative provisions of the Radio Regulations. In order to address and implement these, to update the Radio Regulations as required by these changes, and in order to provide for future growth of specific services, some specialized administrative radio conferences may be necessary.

314. 1979 WARC Agenda Item 2.10 (See Appendix 1 herein) calls upon the Conference to propose to the ITU Administrative Council, and to the next Plenipotentiary Conference, a program for convening future administrative radio conferences to deal with specific services. We have received few comments on this subject. While we feel the matter needs full consideration, we recognize that the actions of the 1979 Conference itself will dictate what future conferences might be required. For example, if the 1979 WARC allocates more HF spectrum to the maritime mobile service, in which the bands are planned, then a subsequent radio conference might be necessary to

bring the new allocations into line with existing and future maritime usage.

315. Other 1979 WARC actions may also necessitate the need for future conferences. We are thus proposing, under agenda item 2.10, that the 1979 WARC propose to the Administrative Council and to the next Plenipotentiary Conference a suitable suggestion for convening future Administrative Radio Conferences to deal with specific services. (See Appendix 32 herein.)

New Recommendations

316. In response to the Fifth Notice, there were no comments which suggested an alternative approach to our handling of new recommendations. We are, therefore, handling recommendations in accordance with our past practice in the various Notices of Inquiry.

317. We are proposing several new recommendations which relate to the space research and radio astronomy services. New Recommendation No. AA recommends that administrations consider that the 1330-1400 MHz band is used for radio astronomy and that future conferences consider how to afford increased protection for radio astronomy in this band. New Recommendation No. BB essentially accomplishes the same purpose for the use of the band 1400-1727 MHz by space research in the search for extraterrestrial civilization. New Recommendation No. CC is an up-dating of Recommendation No. 32 which has been proposed for suppression and recommends that the locations of radio observatories, and the bands in use, be communicated to the Secretary General and the Members of the Union.

318. A new Recommendation No. DD is also proposed. The Radio Astronomy Service Working Group in its initial report to the Commission (incorporating the views of the National Academy of Sciences), and in its comments in response to the Notices of Inquiry, indicated the importance of providing allocations for passive use on the far side of the Moon. The presently heavy use, and expected growth in use, of the electromagnetic spectrum on Earth and the opacity of the Earth's atmosphere and ionosphere makes many radio astronomy observations either difficult or impossible. The far side of the Moon provides a zone from which the observations can be made because the Moon lacks atmosphere and because the relative location of the Earth and Moon results in a region protected from interfering signals generated on or near Earth. However, consideration must be given to earth satellites with high apogees, deep space probes, and transmitters needed to provide radiocommunications for the zone.

319. The 1971 World Administrative Radio Conference for Space Telecommunications defined a shielded area on the Moon and recommended that the CCIR study the frequency bands most suitable for radio astronomy observations on the area. The CCIR has defined a shielded zone of the Moon which includes the surface area and adjacent volume that is shielded from interference originating within a distance of 100,000 km from the center of the Earth. It has issued a preliminary set of guidelines for use of the frequency spectrum and has recommended that use by administrations be in keeping with them. The preliminary guidelines and related text follow:

> "The entire radio frequency spectrum in the shielded zone of the Moon is designated as available for passive users (the radio astronomy service and other passive users as defined in the Radio Regulations), with the following exceptions:
>
> - Frequency bands currently available and allocated in the future to the space research service, and those frequency bands in the space operation service, the earth exploration-satellite service and the radio-determination-satellite service, that are required to support space research;
>
> - Frequency bands currently available or allocated in the future for radiocommunication and for space research transmissions within the lunar shielded zone.
>
> The proposed guidelines do not impose any restrictions on existing or future terrestrial radio services or on existing or future space radio services, the transmitters of which are switched on at a distance of less than 100,000 km from the centre of the Earth.
>
> Under the proposed guidelines, existing or future space radio services the transmitters of which are switched on at a distance of more than 100,000 km from the center of the Earth and which operate in accordance with the Radio Regulations should co-ordinate their activities with the radio astronomy service. It is essential that provisions governing compatibility between the radio astonomy service and other services, based on the technical features of the services, be specified by a decision adopted by an ITU Administrative Conference."

320. Proposed Recommendation No. DD invites the CCIR to continue its studies and recommends that administrations follow any guidance contained in recommendations from the CCIR. We believe that it would be premature for the 1979 Conference to impose more specific allocations or compatibility criteria based upon current technology.

321. New Recommendation No. EE is an updating of Recommendation No. Spa-11, which has been proposed for suppression. Essentially, this recommendation specifies that consideration of the possibility of interference to radio astronomy observations due to satellite transmitters requires greater coordination efforts than previously needed. These proposed Recommendations are shown in Appendix 33 herein.

Radio Operator Certificates

322. Although the subject of radio operators certificates is not on the 1979 WARC agenda, we hope that it can be reviewed at a conference in the near future to determine whether the existing certificate requirements for radio operators are too stringent and lack flexibility needed to resolve domestic problems. For instance, RR No. 7137/849 requires that every ship or aircraft radiotelephone station be controlled by an operator holding a certificate issued by the government to which the station is subject. The certificate signifies that the operator has a practical knowledge of radiotelephone operation and the ability to send and receive spoken messages. The regulations permit the issuance of this certificate (termed "restricted permit" in the United States) without an examination, a procedure followed by the Commission. The permit is then issued for the lifetime of the holder. Is the issuance of a certificate really necessary to assure that the operator has this knowledge and ability? Wouldn't the operator take it upon himself to assure that he knows how to use the radiotelephone correctly; and isn't the operation of the radiotelephone so simple that a novice could learn the proper operating procedure with just a few hours of listening? It is questions like these that we hope can be addressed at a future conference. However, since the agenda for the 1979 WARC is closed on this subject, we have made no proposals in this regard.

Section VII.

Rearrangement of the Radio Regulations

323. Resolution No. Sat-10 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, proposed an editorial and structural "Re-Arrangement of the Radio Regulations". Essentially, the "Re-Arrangement" is divided into Part A which concerns terminology, technical provisions, frequencies, notification, interference, and administrative matters; Part B which concerns the specific radio services; and the Appendices to the Radio Regulations.

324. In the Ninth Notice of Inquiry, comments were sought on Part B and added Appendices B and C of the "Re-Arrangement". It was felt that the revisions of Part A and the remaining Appendices of the "Re-arrangement" were minor and thus no comments were sought on those portions. Particular attention was directed toward the Aeronautical, Maritime and Land Mobile chapters of Part B of the "Re-arrangement"; and the proposed retention of RR No. 3214/109 with Appendix B, and the movement of APC3-/747 into new Appendix C.

325. In response to the Ninth Notice, comments were filed by the Aircraft Owners and Pilots Association (AOPA), Aeronautical Radio Inc. and the Air Transport Association of America (ARINC/ATA) and the Western Union Telegraph Company (Western Union). Reply comments were received from the Private Land Mobile Service Working Group (PLMSWG) and the Communications Satellite Corporation (COMSAT). In addition, the comments of the Radio Technical Commission for Aeronautics (RTCA) on the "Re-Arrangement" were received. We note that no comments were filed for the Maritime Mobile Services Chapter of the Re-arrangement. We feel that, generally, this particular chapter has few distortions as published and we have included only minor adjustments to the text in Appendix 24 of this Report and Order. Additionally, minor editiorial adjustments to Part A of the "Re-arrangement" have been included, with the understanding that some of these adjustments may be overcome by events at the 1979 WARC. With regard to the proposed Appendices B and C of the Re-arrangement, Western Union commented that, due to their physical size and lack of precedent of placing such material in appendices, the present provisions should remain in the body of the Radio Regulations. In their reply comments, however, COMSAT favored the use of such appendices. COMSAT's reasoning is that the "material subject to change should be placed in a separate appendix to permit ease of amendment". COMSAT's comment is well taken. The Table of Allocation of International Call Sign Series (Proposed Appendix C) has increased considerably since the 1959 conference. However, the point of issue was the advisability of appending this

provision and that pertaining to the Table Classification of Typical Emissions (Proposed Appendix B) to the main body of the Radio Regulations, thereby altering their legal status. We do not believe that appending the Table of Classification of Typical Emissions and the Table of Allocation of International Call Sign Series will cause serious problems, and thus we support the adoption of new Appendices B and C. The Land Mobile Service Chapter of Part B was addressed by the Private Land Mobile Service Working Group (PLMSWG). We concur with the PLMSWG's comments and thus propose extensive changes to Chapter NXII, Part B of the "Re-Arrangement". The remaining provisions of this chapter, which have not been proposed for modifications, are retained so as to enhance the resolution of international interference; it is understood that the next competent conference will address the needs of additional regulations intended solely for the land mobile service.

326. ARINC/ATA and AOPA filed comments concerning the provisions of th chapter in Part B relating to the aeronautical mobile service. We note that the comments filed closely resemble the suggested changes promulgated by the Montreal ICAO Communications Divisional meeting in 1978. A majority of the suggested changes proposed by ARINC/ATA were purely editorial and acceptable under Agenda Item 2.7 for the 1979 WARC. Some provisions were substantive in nature and unfortunately could not be addressed under that particular Agenda Item. Those provisions, considered to be editorial in nature, are incorporated into Appendix 34 of this Report and Order.

327. Several comments were received concerning the physical formatting of the "Re-arrangement" itself. The physical formatting of the "Re-arrangement" is not considered appropriate for the proposals; however, we will retain these for reference and appropriate action at the 1979 WARC.

Section VIII.

Existing Resolutions and Recommendations

328. In the Fifth Notice, we presented our suggestions on treatment of the Resolutions and Recommendations now contained in the Radio Regulations. Few comments were received suggesting changes. We will, therefore, continue our basic approach towards the disposition of the existing Resolutions and Recommendations, as shown in Appendix 35 herein.

329. We are proposing that most of the Resolutions adopted at the 1959 Administrative Radio Conference be abrogated, because in most cases, the actions required have taken place, and there is no need for them to remain in force.
Insofar as the Recommendations from that same 1959 Conference are concerned, we have proposed to suppress a few, and retain the majority. The Recommendations are still applicable calling on various entities to perform certain actions, which we feel are still necessary.

330. We have also made proposals addressing all of the Resolutions and Recommendations resulting from the past specialized radio conferences. In many cases, we propose no change since we feel that certain actions must continue and that studies must continue to be carried out. In other cases, the Resolutions and Recommendations have been overtaken by events, studies, and the like and consequently these can be abrogated. The results of the SPM must also be taken into account.

331. Elsewhere in the appendices, one new Resolution No. BB, and four new Recommendations Nos. CC, DD, EE and FF have been proposed. In these five cases, we are proposing a new Resolution or recommendation essentially replacing one from a previous conference. We have, therefore, proposed that the replaced Resolution and Recommendations be suppressed as shown in Appendix 35 herein.

332. Lastly, in our proposals herein we reflect the Final Acts of the 1978 Aeronautical Mobile (R) WARC. This conference abrogated a number of Resolutions and Recommendations and added several others. Our proposals accordingly, take the results of this conference into consideration.

Section IX.

Administrative Matters

333. This proceeding has served as the vehicle by which a major portion of the attached proposals were developed and refined to their present state. The attached proposals will be forwarded to the Department of State and are expected to constitute the basis for the formal proposals of the United States of America to be submitted by the Department of State for consideration by the 1979 World Administrative Radio Conference.

334. It should be recognized that the proposals of the United States to the 1979 WARC are proposals which address the 1959 version of the international Radio Regulations, as modified by subsequent radio conferences and formatted according to the Re-arrangement of the Radio Regulations. The latest published version of these Radio Regulations is dated 1976 and does not contain the Final Acts of the 1978 Aeronautical Mobile (R) Conference. When considering the U.S. Proposals, it should be noted that these Radio Regulations have been modified to a small extent by the 1978 Conference, and our proposals have been made in recognition of those modifications.

335. This Report and Order is adopted pursuant to Section 4(i) of the Communications Act of 1934, as amended. It is ORDERED that this proceeding is hereby TERMINATED.

FEDERAL COMMUNICATIONS COMMISSION*

William J. Tricarico
Secretary

*See attached Statement of Chairman Charles D. Ferris and the Joint Separate Statement of Commissioner Abbott Washburn and Commissioner James H. Quello.